MT3255 AND MT3270 SERIES
CONVEYOR OVEN
SERVICE AND REPAIR MANUAL

BLODGETT OVEN COMPANY

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CHAPTER 1

INTRODUCTION

OVEN SPECIFICATIONS

VENTILATION REQUIREMENTS

The hood should completely cover the unit with an overhang of at least 6" (15 cm) on all sides not adjacent to a wall. The distance from the floor to the lower edge of the hood should not exceed 7' (2.1 m). The ventilation system should replace 80% of the exhaust volume with fresh make up air. TABLE 1 should be used as a guideline.

	Single	Double	Triple
CFM	1200-1650	2400-3300	3600-5000
M^3/min	34 - 47	68-93	102-142

TABLE 1

ELECTRICAL SPECIFICATIONS

NOTE: Three Phase hookup is not permitted on gas models.

WARNING: DO NOT INSTALL A "HIGH LEG" TO ANY CONVEYOR OVEN!

Installations within the U.S.

The MT3255 and MT3270 require a 15 Amp, 60HZ, 1Φ, 208-240VAC, 4 wire service consisting of L1, L2, neutral and ground. See FIGURE 1. Use 90°C wire and size to National Electric or local codes.

Installations outside the U.S.

The MT3255G and MT3270 require a 15 Amp, 50Hz, 1Φ, 230 VAC, 3 wire service consisting of L1, neutral and ground. See FIGURE 1. Use 90°C wire and size wire according to local codes.

The MT3255E is available in two voltage options. The 380/220 VAC oven requires a 52 Amp, 50Hz, 3Φ, 4 wire service consisting of L1, L2 neutral and ground. The 415/240 oven requires a 48 Amp, 50Hz, 3Φ, 3 wire service consisting of L1, neutral and ground. See FIGURE 1. Use 90°C wire and size wire according to local codes.

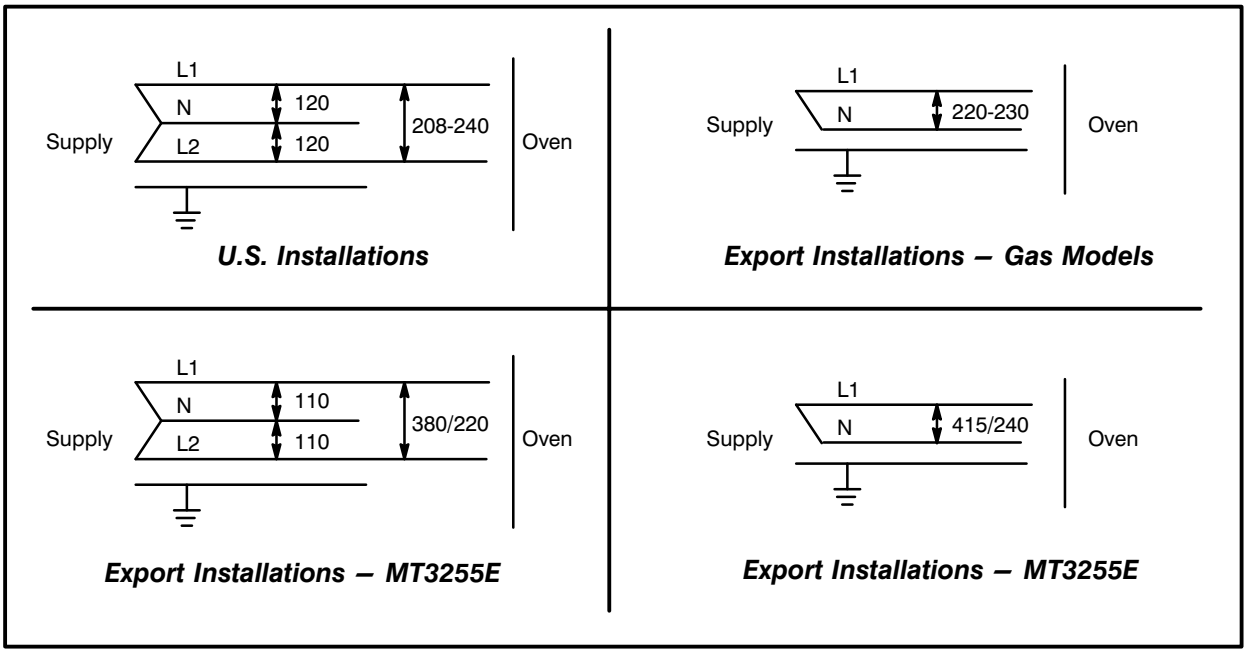


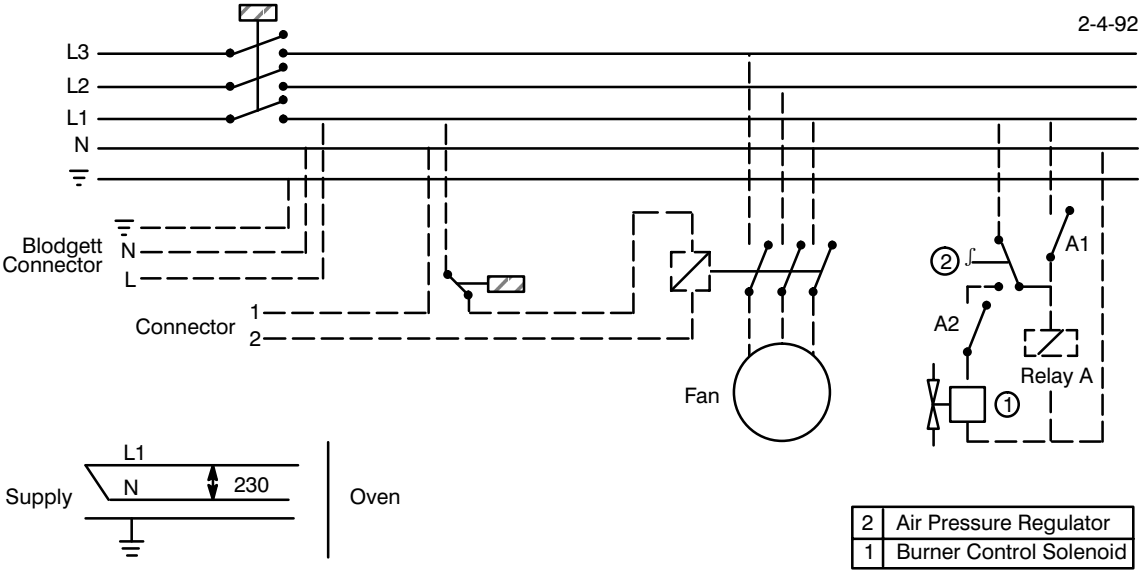
FIGURE 1

CE approved installations

Connect the oven to a separate group 230V, 50 hz with rigid connection and circuit breaker. The circuit breaker should disconnect all poles, including neutral with a contact separation of at least 3 mm. See FIGURE 2. Use 90°C wire and size according to local codes.

NOTE: The burner control unit is phase sensitive. If the phase and neutral are switched the control locks out.

Connect exhaust fan connector 1 and 2. See FIGURE 2. Connect phase + neutral + ground.



MT1828G CE Approved Installations

FIGURE 2

GAS SPECIFICATIONS

GAS CONNECTIONS

Domestic and General Export installations

The gas line should be large enough to accommodate the peak demand of all the gas appliances. TABLE 2 reflects a straight line, 50 foot run with no coupling restrictions and no other appliances drawing service. Gas line installations MUST conform to National Fuel Gas Code NFPA 54/ANSI Z223.1 Sec. 1.4 (Latest Edition). TABLE 2 should be used as a guideline only.

NOTE: For any pipe runs over 50 feet (15 m), consult the factory.

CE approved installations

1. Connect the oven to the gas line with the proper type of gas according to Local and National Installation Standards. See TABLE 2.

GAS REQUIREMENTS

The firing rate for the MT3255 and MT3270 is 150,000 BTU/Hr. (43.9 kW/Hr.)

NOTE: For natural gas meter sizing, consult your local gas company to ensure that your meter will provide the proper supply.

Installations within the U.S.

1. Add the total BTU's/hr of all the gas appliances.
2. Convert BTU's to cubic ft/hr using the formula Cu Ft/Hr = 1000 BTU/Hr for natural gas.
3. Size the meter accordingly.

Installations outside the U.S.

1. Add the total M^3/min of all the appliances.
2. Size the meter accordingly.

DOMESTIC AND GENERAL EXPORT

	Natural Gas			Propane Gas		
Gas Line Sizing						
Single	3/4" line			3/4" line		
Double	1-1/4" line			1″ line		
Triple	1-1/4" line			1-1/4" line		
Orifice Size	#1			#29		
Incoming Gas Pressure	W.C.	kPa	mbar	W.C.	kPa	mbar
Static	7"	1.74	17.4	12.5"	3.11	31.1
Operational	5.5"	1.36	13.7	11"	2.73	27.4

CE APPROVED UNITS

Type of Gas	Inlet Pressure mbars	Burner Pressure mbars	Injector Diameter mm	Air Opening mm	Pilot Injector mm	Standard Delivery Value kW (H_S)
G25	25	12	5,80	16	2 x 0,63	46 Nat. Gas
G20	20	8	5,80	16	2 x 0,63	46 Nat. Gas
G20/G25	20/25	Totally Inscrewed Pressure Regulator	5,15	16	2 x 0,63	46 Nat. Gas
G31	30/37/50	24	3,48	16	2 x 0,30	46 Propane

TABLE 2

ILLUSTRATED PARTS LISTS

CONVEYOR COMPONENTS

NOTE: ✓ = ASAP Distributor Required Stocking Parts
** = Item too large for UPS*

Ref. No.	Part No.	Description
	21926	Belt, Wire S/S 32" SB (Per Foot) (Total Length MT3270 18 FT, MT3255 16 FT)
	23112	Belt, Wire S/S 15.75" TB (Per Foot) (Total Length MT3270 18 FT, MT3255 16 FT)
	✓M2379	Speed Control Board, Bodine (After 9/90)
	✓M3142	Speed Control Board, Minarik (Before 9/90)
	✓21170	Speed Control Kit, Dart to Minarik
	M0705	Speed Control Board, KBIC w/ Pot.
	✓M2254	Fuse, Line, Bodine Board, 5 AMP, 125V
	✓M2316	Fuse, Armature, Bodine Board, 200 MA, 250V
	✓M3145	Potentiometer, Bodine, 10 K
	✓M3143	Potentiometer, Minarik, 5 K
	✓M3144	Potentiometer, Dart, 10 K
	21169	Knob, Speed Control Potentiometer
	✓M0200	Lock, Speed Control Potentiometer
	✓M0201	Dial, Speed Control Potentiometer
	✓M3146	Time Display, Digital
	✓M3147	Pick—Up, PV—10 (for M3146)
	M3393	Speed Control, Dart Micro—Drive
	✓M0984	Pick—Up, PV—2 (for M3393)
	M5770	Conversion Kit, Digital Time (Open Loop) to Micro-Drive (Closed Loop)
	✓M3127	Motor, Conv. Drive, Bodine 90V (Before 9/90)
	✓M2378	Motor, Conv. Drive, Bodine 130V (After 9/90)
	✓M2500	Brush Set, Bodine
	✓21152	Chain, Drive Single Belt (2.33 FT)
	M0391	Chain, Drive Twin Belt (Specify 5.50 FT & Order M0112)
	✓M0112	Masterlink, Drive Chain
	M2156	Cover, Drive Chain
*	M1730	Conveyor Assy., Drive SB MT3270 (Before 5/3/95)
*	M6144	Conveyor Assy., Drive SB MT3270 (After 5/3/95)
*	M1731	Conveyor Assy., Idle SB MT3270 (Before 5/3/95)
*	M6145	Conveyor Assy., Idle SB MT3270 (After 5/3/95)
*	M1686	Conveyor Assy., Drive TB MT3270 (Before 5/3/95)
*	M6147	Conveyor Assy., Drive TB MT3270 (After 5/3/95)
*	M1688	Conveyor Assy., Idle TB MT3270 (Before 5/3/95)
*	M6148	Conveyor Assy., Idle TB MT3270 (After 5/3/95)
*	M1941	Conveyor Assy., Drive MT3255
*	M1946	Conveyor Assy., Idle MT3255
	✓M0109	Sprocket, Motor Drive, 12 Tooth (1 Per Motor)
	✓M0110	Sprocket, Conveyor Drive, 15 Tooth (Qty 1)
	M1865	Sprocket, Conveyor Drive, 15 Tooth (TB Qty 1)
	✓M0108	Sprocket, Conveyor Belt, 11 Tooth (Qty 14 SB) (Qty 16 TB)
	21301	Sprocket, High Speed (Large)
	✓M0122	Bearing, Conveyor Drive

TEMPERATURE CONTROLS

NOTE: ✓ = ASAP Distributor Required Stocking Parts

COMPUTER CONTROLS

Ref. No.	Part No.	Description
✓	M6474	Computer Control Kit, Closed Loop SB
✓	FW525	Computer Control Kit, Closed Loop SB (Reconditioned)
	M5635	Computer Control Kit, Open Loop TB
	M3175	Decal, Lexan Control SB
	M4400	Decal, Lexan Control TB
✓	M7427	Probe, Temperature RTD, 500 OHMS
	M7202	Conversion Kit, Open Loop to Closed Loop
✓	M3347	Cable, Computer Control, 25 Pin, 10’
✓	M3348	Cable, Computer Control, 9 Pin, 10’
	M3490	Cable, Computer Control, 25 Pin, 50’
	M3491	Cable, Computer Control, 9 Pin, 50’
✓	M3349	Harness, Inter−Connecting DC Drive, 3-Wire (For 9 Pin)
	M3353	Harness, Relay Board (Open Loop) (For 25 Pin) (Before 9/15/95)
	M7237	Harness, Relay Board (Closed Loop) (For 25 Pin) (After 9/15/95)
	M3314	Bracket, Computer Wall
	M5661	Bracket Assy., Cable Clamp
✓	M0984	Pick−Up, PV−2
	M7236	Board, Relay/Transformer
✓	22672	Relay
✓	M3352	Transformer, 120V to 24V
✓	M3295	Thermostat, High Limit (Manual Reset)
✓	M0152	Contact, Emergency Stop Switch
	M3296	Activator, Emergency Stop Switch (Mushroom Shape)
	M3297	Nameplate, Emergency Stop
✓	M3136	Breaker, 7 AMP Circuit
✓	M2772	Breaker, 4 AMP Circuit

SOLID STATE CONTROLS

Ref. No.	Part No.	Description
	M7982	Controller, Analog Temperature (Before Mid 1986)
✓	M3149	Controller, Digital Temperature (After Mid 1986)
✓	M3439	Relay, Digital Temp. Controller, 10 AMP, 250V
✓	M3150	Control Board, Temperature Hi−Lo Limit
✓	M3151	Thermocouple, Dual Lead (Before 9/90)
✓	M3152	Thermocouple, Single Lead (After 9/90)

ELECTRICAL COMPONENTS

NOTE: ✓ = ASAP Distributor Required Stocking Parts

Ref. No.	Part No.	Description
	✓M2316	Fuse, Armature, Bodine Board, 200 MA, 250V
	✓M2254	Fuse, Line, Bodine Board, 5 AMP, 125V
	✓M0156	Fuse, Convection Motor FNM−10 (Qty 8)
	M0702	Fuse Block
	✓M1821	Fuse, Control SC−4 (Qty 3) (Before...)
	✓M0158	Fuse Holder (Qty 3) (Before...)
	✓M3389	Fuse, Ceramic MDA−4 (Qty 3) (After...)
	✓M3390	Fuse Holder (Qty 3) (After...)
	✓M1362	Snap Disc, L140/20F, 2 Pole SPST
	✓M0635	Snap Disc, F110/20F, 2 Pole SPST
	✓M2453	Snap Disc, L140/20F, 3 Pole SPDT (PH)
	M0593	Terminal Block, 2 Pole
	✓M0708	Contactor, 3 Pole, 120V Coil (Convection)
	✓M0595	Switch, Air Pressure SPDT
	21124	Fan Kit, Axial (Old)
	✓21134	Fan, Axial 30 CFM 3−1/2”
	✓M2469	Fan, Axial 110 CFM 4−1/2”
	M0571	Guard & Hardware, Fan 4” (Qty 3)
	✓M0572	Cord, Axial Fan 30” Power
	✓M0152	Selector Switch, Heat & Conveyor
	✓M0153	Selector Switch, Blower
	✓M0151	Knob, Selector Switch (Heat, Conveyor or Blower)
	M1694	Cord Set & Plug Assy., 10 Foot
	M0772	Receptacle, Twist Lock
	✓16998	Relay, Interlock Hood System SPST, 120V (PH)
	16241	Relay, Alarm 3PDT, 120V (PH)
	✓M0791	Indicator Light (PH)

CONVECTION COMPONENTS

Ref. No.	Part No.	Description
	✓M4224	Motor & Blower Assy., CW
	✓M4225	Motor & Blower Assy., CCW
	✓M5722	Insulation Kit for Blowers MT3270
	M7992	Insulation Kit for Blowers MT3255
	M5131	Nozzle Assy. w/ Diverter MT3270/MT3255
	21161	Diverter, Return Air RH MT3270/MT3255
	21162	Diverter, Return Air LH MT3270/MT3255

AIR PLATES

Ref. No.	Part No.	Description
	M3905	Plate Assy., Air RH (R−L or L−R) MT3270 Generic
	M3906	Plate Assy., Air LH (R−L or L−R) MT3270 Generic
	21399	Plate Assy., Air RH (R−L or L−R) MT3255 Generic
	21400	Plate Assy., Air LH (R−L or L−R) MT3255 Generic
	24613	Hook, Air Pan
	22117	Plate Assy., Block Off MT3270/MT3255 Generic

GAS BURNER COMPONENTS

NOTE: ✓ = ASAP Distributor Required Stocking Parts

Ref. No.	Part No.	Description
	22132	Burner Assy., Complete (Specify Model & Gas Type)
✓	M0767	Blower Motor, Combustion w/ Control Box
✓	M2383	Blower Motor, Combustion
✓	M2381	Transformer, 120V to 24V
✓	M2382	Relay, Time Delay
	M0454	Orifice, Main Burner, LP MT3270
	M0455	Orifice, Main Burner, Natural MT3270
	M0579	Orifice, Main Burner, LP MT3255
	M0580	Orifice, Main Burner, Natural MT3255
✓	M2727	Pilot Burner & Igniter Assy., LP
✓	M2726	Pilot Burner & Igniter Assy., Natural
	M6378	Shield, Pilot Burner
✓	M0415	Flame Sensor
✓	M2690	Orifice, Pilot LP
✓	M0697	Orifice, Pilot Natural
	M0248	Tube, Pilot Aluminum 1/4”
	M0959	Fitting, Compression 1/4”
	M2799	Union, Compression
	21225	Fitting, Elbow
	M0279	Union, 1/2 Inch Black
	1949	Nipple, Pipe 1/2 x 1−3/16 Close
	M0317	Elbow, 1/2 Inch Street 90 Deg.
	597	Ell, Black 90 Degree
	M0590	Nipple, Pipe 1/2 x 2−1/2
	17874	Ell, Black 1/2 x 3/4
✓	23007	Spring, Solenoid Valve, LP to Natural
✓	18612	Spring, Solenoid Valve, Natural to LP
	23114	Conversion Kit, LP to Natural MT3270
	23113	Conversion Kit, Natural to LP (Before 5/89) MT3270
✓	21389	Conversion Kit, Natural to LP (After 5/89) MT3270
	M5259	Conversion Kit, LP to Natural MT3255
	M5290	Conversion Kit, Natural to LP MT3255
✓	M5495	Dual Solenoid/Pressure Regulator, Nat. 24V
✓	22190	Dual Solenoid/Pressure Regulator, LP 24V
✓	20287	Valve, Single Solenoid 110/120V
✓	M0282	Valve, Manual Gas
✓	M1054	Spark Box, 24V
	21242	Connector Kit, Gas Flex 48”
	21826	Connector Kit, Gas Flex 36”
	M7249	Flame Tube Assy., MT3270
	M6435	Flame Tube Assy., MT3255

EXTERIOR COMPONENTS

NOTE: ◆ = Doors are not returnable

Ref. No.	Part No.	Description
	M3979	Decal, Control Lexan MT3270 (One Piece)
	M3959	Decal, Control Lexan MT3255 (One Piece)
	M4607	Crumb Pan, Idle (Solid) (Before 5/3/95)
	M6164	Crumb Pan, Idle (Solid) (After 5/3/95)
	M2456	Crumb Pan, Idle (w/ Holes) (Before 5/3/95)
	M6166	Crumb Pan, Idle (w/ Holes) (After 5/3/95)
	M4606	Crumb Pan, Drive (Solid) (Before 5/3/95)
	M6163	Crumb Pan, Drive (Solid) (After 5/3/95)
	M2458	Crumb Pan, Drive (w/ Holes) (Before 5/3/95)
	M6165	Crumb Pan, Drive (w/ Holes) (After 5/3/95)
NOTE:		*Note: Crumb pans with holes are used on middle & topsections only. The solid crumb pans are used on the bottom section.*
	M2875	Stop, Product
	M4304	Extension Assy., Product 15”
	M4303	Extension Assy., Product 20”
	M4222	Extension Assy., Product 30”
	M4609	15” Product Extension & Crumb Pan, Idle
	M4608	15” Product Extension & Crumb Pan, Drive
	M4611	20” Product Extension & Crumb Pan, Idle
	M4610	20” Product Extension & Crumb Pan, Drive
	21293	End Plug, Top
	M5610	End Plug, Bottom
◆	21172	Door, Pull Down Conversion Kit (Before 7/89) MT3270
◆	M1963	Door, Pull Down (After 7/89) MT3270
	M2229	Handle, Pull Down 34” MT3270
◆	21888	Door, Pull Down MT3255
	M2189	Handle, Door Pull Down 22” MT3255
	21935	Latch Conversion, Pull Down Door
	M1872	Plate, RH Pivot Slotted
	M1871	Plate, LH Pivot Slotted
	16470	Nameplate, Blodgett 10”
	22229	Stacking Assy., Double
	22067	Triple Base w/ Casters
	21390	Legs, 17—1/4” w/ Casters (Double) (Set of 4)
	21391	Legs, 23—1/4” w/ Casters (Single) (Set of 4)
	14444	Casters, Cradle (Triple) (Set of 4)
	M5032	Chimney Kit, Single MT3270/MT3255
	M7160	Chimney Kit, Double MT3270/MT3255
	M7200	Chimney Kit, Triple MT3270/MT3255
	M2472	Body Back, MT3270 S/S
	22109	Body Back, MT3255 S/S
	M5020	Panel Assy., Control Box

EXCLUSIVE TO EXPORT 50 HZ

NOTE: ✓ = ASAP Distributor Required Stocking Parts

Ref. No.	Part No.	Description
	M2245	Valve, Solenoid
	M2276	Burner Assy., Complete (Specify Gas Type)
	M0706	Orifice, Main Burner (Specify MTD)
	M4597	Motor & Blower Assy., CW
	M4598	Motor & Blower Assy., CCW
	M3153	Digital Speed Control Board, Bodine
	M3154	Time Display, Digital
	M3128	Motor, Straight Shaft, 180V
✓	23034	Fan, Axial 110 CFM 4−1/2" 240V
✓	21430	Fan, Axial 34 CFM 3−1/2" 240V
	M5282	Element Assy., 220V MT3255E
	M5281	Element Assy., 240V MT3255E
	M6897	Element, Individual, 220V MT3255E
	M6898	Element, Individual, 240V MT3255E
	M2247	Contactor, 240V, 50 HZ
	M2384	Transformer
	M2385	Relay
	M2386	Blower Motor, Combustion
	M2630	Fuse, Line & Armature, Bodine Board, 5 AMP 250V
	M3155	Digital Temperature Controller C°
	M7880	Computer Control Kit, Closed Loop SB (CE)
	M7333	Pilot Burner & Ignitor Assy., LP (CE)
	M7334	Pilot Burner & Ignitor Assy., Natural (CE)
	M3237	Burner Assy. (CE)
	M2497	Switch, Push Button (CE)
	M2498	Switch, Contact (CE)
✓	M0595	Switch, Air Pressure SPDT (CE)
	M3172	Timer, Fixed, 2 Second (CE)
	M3173	Timer, Fixed, 10 Second (CE)
✓	R1530	Contactor, Mercury, 240V Coil (CE)
	M3166	Fuse, GDA−4A (CE)
	M3167	Fuse Holder (CE)
	M2549	Strip, Terminal (CE)
	M3168	Spark Box, 240V (Landis & Gyr) (CE)
	R1586	Terminal Block, Power (CE)
	R0166	Terminal Block, Ground (CE)
	R1580	Stop, End (CE)
✓	16037	Indicator Light, 250V, Red, Round (CE & Australia)
	90250	Relay, 240V 3PDT (CE)
	16775	Relay, SPST, 240V, 30 AMP (CE)
	M6000	Dual Solenoid/Pressure Regulator, Nat. (CE)
	M6001	Dual Solenoid/Pressure Regulator, LP (CE)
	M3330	Switch, Air Pressure Differential (mbr) (CE)

MT3255E GENERAL EXPORT CONTROL BOX

(Control Plate not shown)

MT3255G AND MT3270 DOMESTIC & GENERAL EXPORT CONTROL BOX

(Control Plate and/or Gas Burner Components not Shown)

MT3255 AND MT3270 CE CONTROL BOX

(Control Plate and/or Gas Burner Components not Shown)

MT3255 AND MT3270 DOMESTIC GAS BURNER COMPONENTS

(Control Box not Shown)

MT3255 AND MT3270 CE GAS BURNER COMPONENTS

(Control Box not Shown)

MT3255 AND MT3270 DOMESTIC & GENERAL EXPORT SB CONTROL PLATE ASSY

MT3255 AND MT3270 CE SB CONTROL PLATE ASSY

MT3255 AND MT3270 EXTERIOR OVEN VIEW

CHAPTER 2

ASSEMBLY

OVEN ASSEMBLY PROCEDURES

RETURN AIR DIVERTERS

1. Slide the return air diverters into the oven. The edge of the diverter should be 3” (7.6 cm) from the outside edge of the oven cavity.

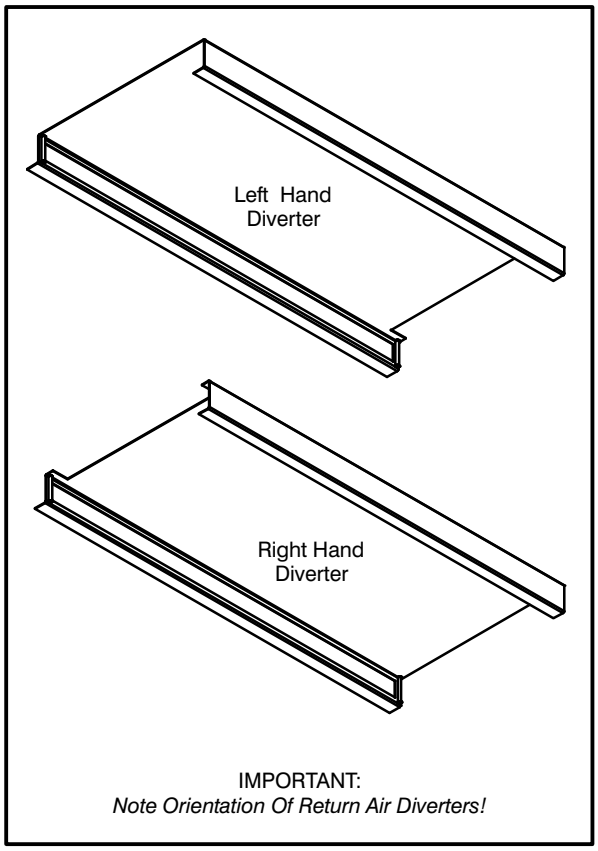


FIGURE 1

AIR NOZZLES

1. Install the nozzles from the center of the oven working toward the ends. Make sure the bottom of the nozzle fits into the slot of the nozzle support located at the front of the oven.
2. Secure the nozzle hold-down strip across the inside front of the oven using the existing screws on the wall.

CONVEYOR BELT SUPPORTS

1. Slide the left conveyor belt support (with the sprocket on the end of the shaft) into the support tracks. The sprocket must be located inside the control panel after being pushed into the oven.
2. Fasten the 1/4-20 hex head screw from the control box into the belt support.
3. **Older Oven Models** – install the washer between the control box and the tracks.

   Later Oven Models – use a formed metal dimple in place of the washer.
4. Slide the right conveyor belt support into the support tracks until it touches the left support. Make sure that the rack sides do not overlap.

WIRE CONVEYOR BELT

NOTE: The conveyor belt has loops on both sides. The belt must be installed so the loops travel as shown in FIGURE 2.

1. Thread the wire belt from the right side of the oven, lower level first.
2. After pushing the belt through on the lower level, leave about 12” (30.5 cm) hanging out on the left side.
3. Take the remainder of the belt, loop it around the right shaft, and push it through on the upper level. The two ends of the belt should be approximately 6-9” (15-22 cm) past the left shaft (right shaft if right to left travel is required) on the upper level of the belt support.

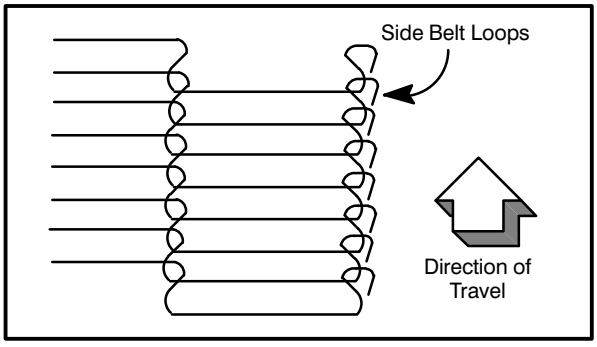


FIGURE 2

4. Install the inner and outer master links as shown in FIGURE 3.

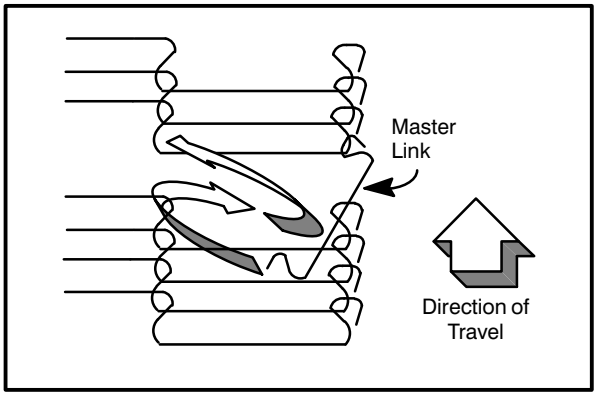


FIGURE 3

Unless otherwise specified, the conveyor travel is factory set for left-to-right operation when facing the drop down door. If a direction change is required, the polarity of the drive motor must be reversed. To change the polarity of the drive motor, disconnect the oven from the power source and interchange the black and white motor leads at the D.C. Controller Board located within the control box. **If the polarity of the motor is changed to right-to-left belt travel, the conveyor belt must be installed from the left side of the oven instead of the right side.**

NOTE: Reconfigure the air plates whenever the conveyor belt direction of travel is changed. See FIGURE 4.

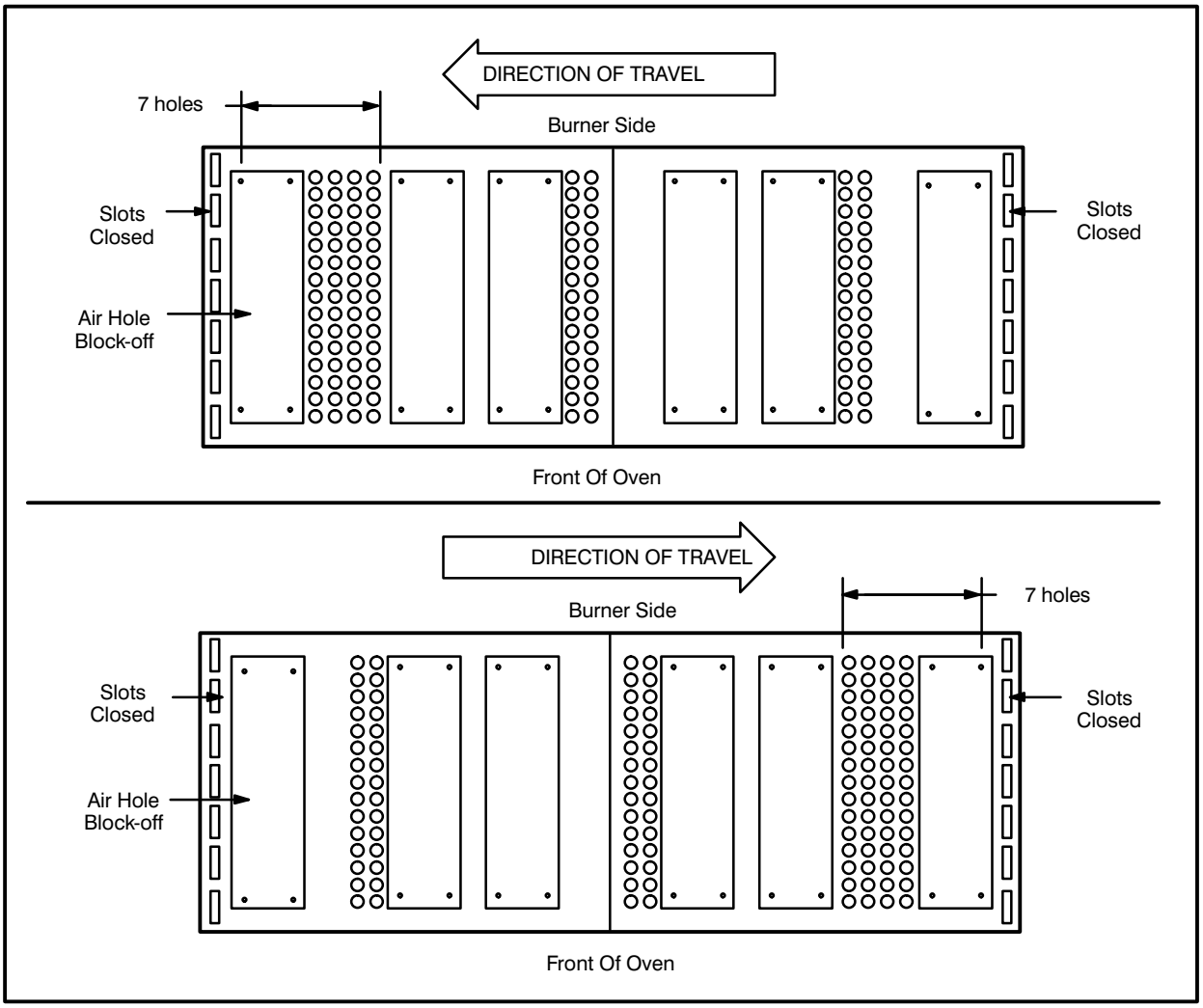


FIGURE 4

DRIVE CHAIN

1. Install the drive chain around the drive motor and then around the sprocket on the conveyor belt support.
2. Push the conveyor motor back to tighten the drive chain.
3. Lock the motor into position by tightening the four 1/4-20 hex head screws and dimples (washers on older models) between the conveyor motor and the control box.

   NOTE: Twin belt models have a double sprocket, chain and motor.

END PLUGS

1. Install the upper and lower end plugs at both ends of the oven.

CRUMB PANS

1. Install the crumb pans under each end of the conveyor.

   NOTE: On stacked ovens, either use perforated crumb pans or install the pans on the lower oven only.

WINDOW HANDLE

1. Install the window handle.

CHAPTER 3

OPERATION

STANDARD CONTROL OPTIONS

U.E. TEMPERATURE CONTROLLER WITH OPEN LOOP DC DRIVE SYSTEM

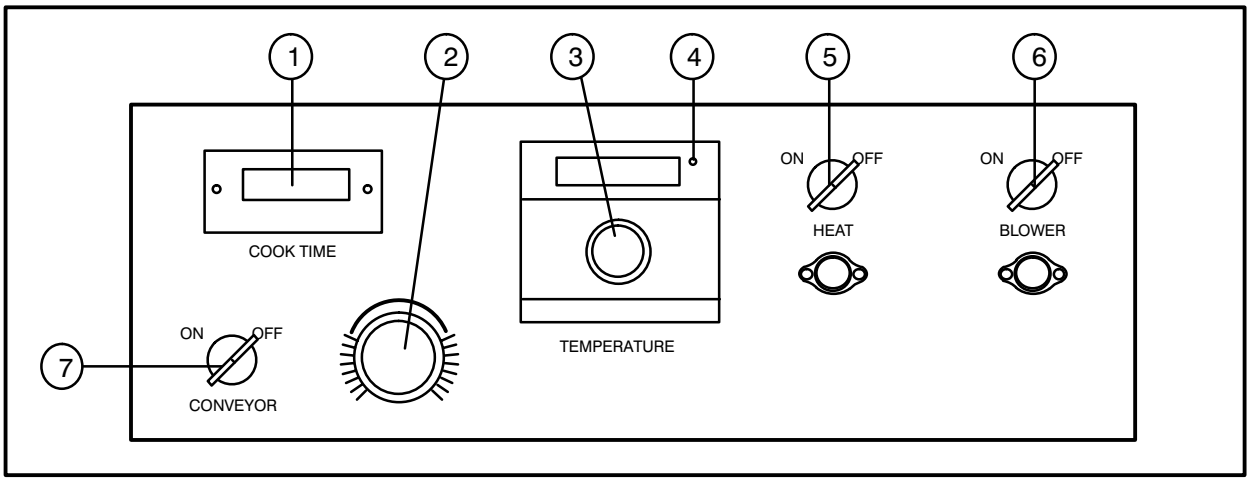


FIGURE 1

CONTROL DESCRIPTION

1. COOK TIME DISPLAY – Displays the belt speed.
2. CONVEYOR ADJUSTMENT KNOB – Turn to adjust the conveyor speed.
3. TEMPERATURE CONTROL KNOB – Turn to set cook temperature.
4. HEAT LIGHT – Indicates the control is calling for heat.
5. HEAT SWITCH – Controls power to the burner.
6. BLOWER SWITCH – Controls power to the blowers.
7. CONVEYOR SWITCH – Controls power to the conveyor motor.

CONTROL OPERATION

1. Turn the manual gas valve to the *OPEN* position. This is only necessary on initial start-up.
2. Turn the BLOWER SWITCH (6) to *ON*.
3. Push and turn the TEMPERATURE CONTROL KNOB (3) clockwise to the desired setting.
4. Turn the HEAT SWITCH (5) to *ON*. The burner purge timer will be energized. After approximately thirty (30) seconds, a spark ignites the burner. Initial start may require longer due to air in the gas line.

   *NOTE: If the oven fails to ignite after the thirty (30) second purge, turn the HEAT SWITCH (*5*) to OFF and wait 5 minutes before turning back to ON.*
5. Turn the CONVEYOR SWITCH (7) to *ON*. The conveyor belt starts to travel through the oven. This circuit is independent and can be turned on or off without affecting any other operations. Adjust the conveyor speed as follows:

   Turn the ADJUSTMENT KNOB (2) clockwise to increase speed, counter-clockwise to decrease speed. Turn the knob-lock behind the control knob to hold the desired belt speed
6. Turn the BLOWER (6), CONVEYOR (7) and HEAT (8) SWITCHES to *OFF*. The Cool Down circuit is energized. The blower motor(s) continue to run until the oven temperature is between 135–170°F (57–77°C). The digital temperature display remains lit until the cool down circuit de-energizes.

The oven will hold these parameters daily and will require no further adjustments unless a different product is placed in the oven.

NOTE: Each oven contains different components and must be adjusted individually.

U.E. TEMPERATURE CONTROLLER WITH CLOSED LOOP DC DRIVE SYSTEM

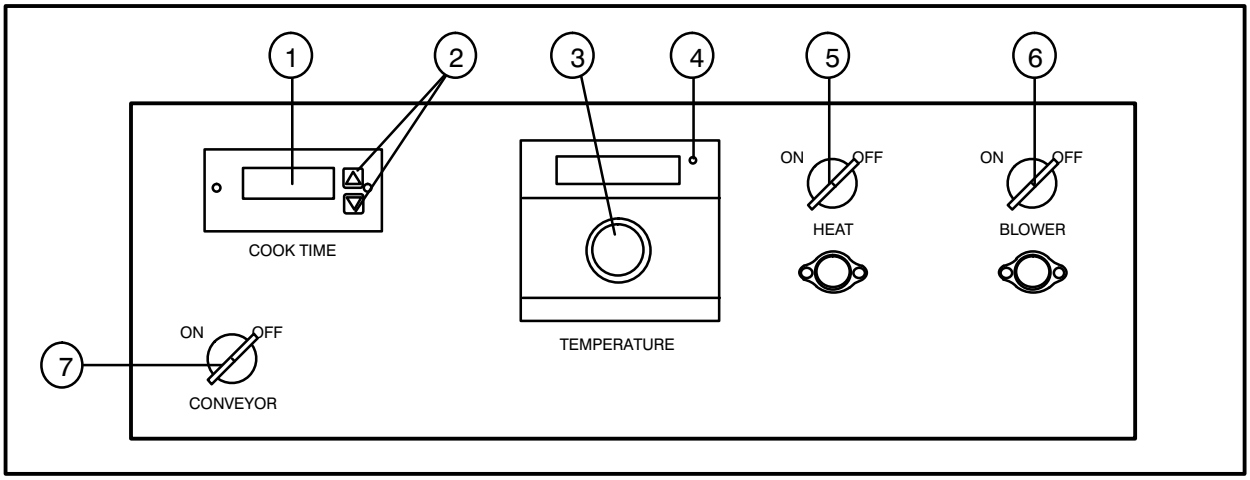


FIGURE 2

CONTROL DESCRIPTION

1. COOK TIME DISPLAY – Displays the belt speed.
2. CONVEYOR ADJUSTMENT KEYS – Press to adjust the conveyor speed.
3. TEMPERATURE CONTROL KNOB – Turn to set cook temperature.
4. HEAT LIGHT – Indicates the control is calling for heat.
5. HEAT SWITCH – Controls power to the burner.
6. BLOWER SWITCH – Controls power to the blowers.
7. CONVEYOR SWITCH – Controls power to the conveyor motor.

CONTROL OPERATION

1. Turn the manual gas valve to the *OPEN* position. This is only necessary on initial start-up.
2. Turn the BLOWER SWITCH (6) to *ON*.
3. Push and turn the TEMPERATURE CONTROL KNOB (3) clockwise to the desired setting.
4. Turn the HEAT SWITCH (5) to *ON*. The burner purge timer will be energized. After approximately thirty (30) seconds, a spark ignites the burner. Initial start may require longer due to air in the gas line.

   *NOTE: If the oven fails to ignite after the thirty (30) second purge, turn the HEAT SWITCH (*5*) to OFF and wait 5 minutes before turning back to ON.*

5. Turn the CONVEYOR SWITCH (7) to *ON*. The conveyor belt starts to travel through the oven. This circuit is independent and can be turned on or off without affecting any other operations. Adjust the conveyor speed as follows:

   Press the UP ARROW (2) to increase the conveyor speed and the DOWN ARROW (2) to decrease the conveyor speed.

6. Turn the BLOWER (6), CONVEYOR (7) and HEAT (8) SWITCHES to *OFF*. The Cool Down circuit is energized. The blower motor(s) continue to run until the oven temperature is between 135–170°F (57–77°C). The digital temperature display remains lit until the cool down circuit de-energizes.

The oven will hold these parameters daily and will require no further adjustments unless a different product is placed in the oven.

NOTE: Each oven contains different components and must be adjusted individually.

ATHENA TEMPERATURE CONTROLLER WITH OPEN LOOP DC DRIVE SYSTEM

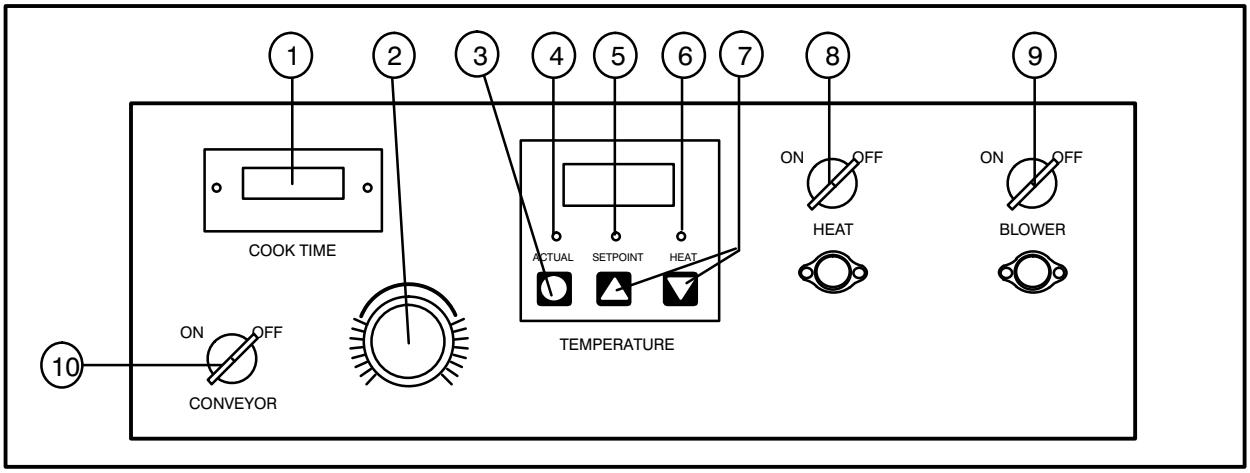


FIGURE 3

CONTROL DESCRIPTION

1. COOK TIME DISPLAY — Gives the belt speed.
2. CONVEYOR ADJUSTMENT KNOB — Turn to adjust the conveyor speed.
3. ACTUAL TEMPERATURE KEY — Press to display the actual oven temperature.
4. ACTUAL TEMPERATURE LIGHT — When lit indicates the control is displaying the actual oven temperature.
5. SETPOINT LIGHT — When lit indicates control is displaying desired cook temperature.
6. HEAT LIGHT — When lit indicates that the control is calling for heat.
7. UP and DOWN ARROW KEYS — Used to increase/decrease desired cook temperature.
8. HEAT SWITCH — Controls power to the burner.
9. BLOWER SWITCH — Controls power to the blowers.
10. CONVEYOR SWITCH — Controls power to the conveyor motor.

CONTROL OPERATION

1. Turn the manual gas valve to the *OPEN* position. This is only necessary on initial start-up.
2. Turn the BLOWER SWITCH (9) to *ON*.
3. Press the UP or DOWN ARROW keys (7) to enter the desired cook temperature.
4. Turn the HEAT SWITCH (8) to *ON*.

   NOTE: If the oven fails to ignite after the thirty (30) second purge, turn the blower switch OFF and wait 5 minutes before turning back ON.

5. Press the ACTUAL TEMPERATURE KEY (3). If the actual temperature matches the setpoint the oven is ready to cook.

   NOTE: The display will flash until the actual temperature is within the preset deviation alarm band. The default setting is ± 20°F of the setpoint.

6. Turn the CONVEYOR SWITCH (10) to *ON*. The conveyor belt starts to move. Turn the CONVEYOR ADJUSTMENT KNOB (2) clockwise to increase speed, counter-clockwise to decrease speed. Turn the knob-lock behind the control knob to hold the desired belt speed
7. Turn the BLOWER (6), CONVEYOR (7) and HEAT (8) SWITCHES to *OFF*. The Cool Down circuit is energized. The blower motor(s) continue to run until the oven temperature is between 135—170°F (57—77°C). The digital temperature display remains lit until the cool down circuit de-energizes.

The oven will hold these parameters daily and will require no further adjustments unless a different product is placed in the oven.

NOTE: Each oven contains different components and must be adjusted individually.

ATHENA TEMPERATURE CONTROLLER WITH CLOSED LOOP DC DRIVE SYSTEM

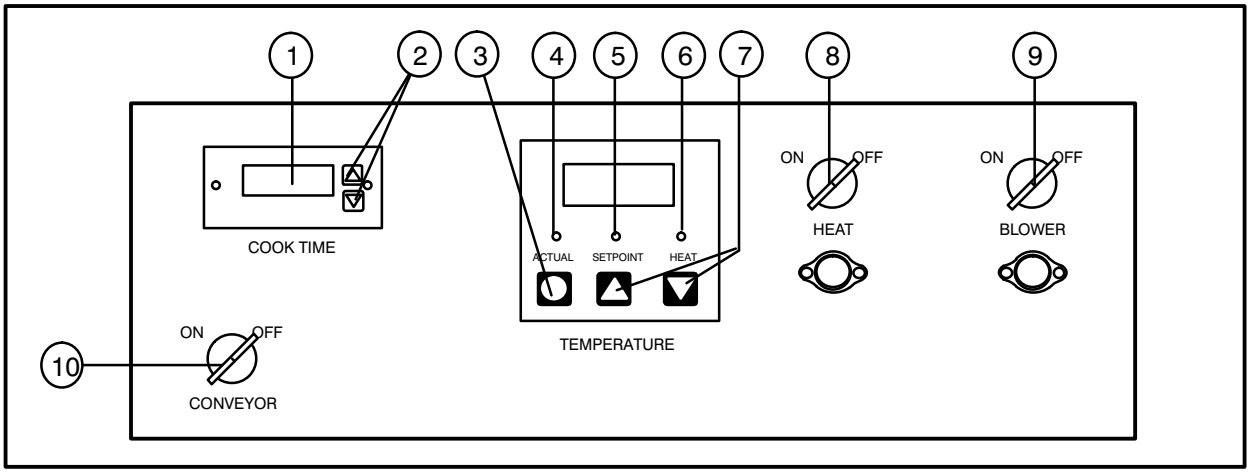


FIGURE 4

CONTROL DESCRIPTION

1. COOK TIME DISPLAY – Gives the belt speed.
2. ACTUAL TEMPERATURE KEY – Press to display the actual oven temperature.
3. CONVEYOR ADJUSTMENT KEYS – Press to adjust the conveyor speed.
4. ACTUAL TEMPERATURE LIGHT – When lit indicates the control is displaying the actual oven temperature.
5. SETPOINT LIGHT – When lit indicates control is displaying desired cook temperature.
6. HEAT LIGHT – When lit indicates that the control is calling for heat.
7. UP and DOWN ARROW KEYS – Used to increase/decrease desired cook temperature.
8. HEAT SWITCH – Controls power to the burner.
9. BLOWER SWITCH – Controls power to the blowers.
10. CONVEYOR SWITCH – Controls power to the conveyor motor.
11. CONVEYOR ADJUSTMENT KNOB – Turn to adjust the conveyor speed.

CONTROL OPERATION

1. Turn the manual gas valve to the *OPEN* position. This is only necessary on initial start-up.
2. Turn the BLOWER SWITCH (9) to *ON*.
3. Press the UP or DOWN ARROW keys (7) to enter the desired cook temperature.
4. Turn the HEAT SWITCH (8) to *ON*.

   NOTE: If the oven fails to ignite after the thirty (30) second purge, turn the blower switch OFF and wait 5 minutes before turning back ON.
5. Press the ACTUAL TEMPERATURE KEY (3). If the actual temperature matches the setpoint the oven is ready to cook.

   NOTE: The display will flash until the actual temperature is within the preset deviation alarm band. The default setting is ± 20°F of the setpoint.
6. Press the UP ARROW (2) to increase the conveyor speed and the DOWN ARROW (2) decreases the conveyor speed.
7. Turn the BLOWER (6), CONVEYOR (7) and HEAT (8) SWITCHES to *OFF*. The Cool Down circuit is energized. The blower motor(s) continue to run until the oven temperature is between 135–170°F (57–77°C). The digital temperature display remains lit until the cool down circuit de-energizes.

The oven will hold these parameters daily and will require no further adjustments unless a different product is placed in the oven.

NOTE: Each oven contains different components and must be adjusted individually.

COMPUTER CONTROLLER

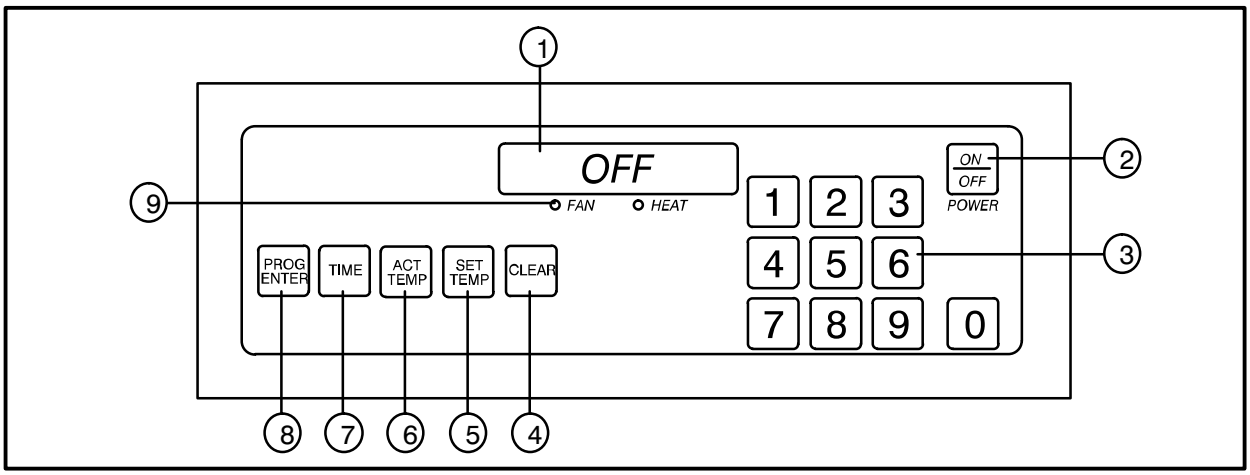


FIGURE 5

CONTROL DESCRIPTION

1. DIGITAL DISPLAY — Displays the time, temperature and controller related information.
2. OVEN ON/OFF — Controls power to the oven.
3. NUMERIC KEYS — Used to enter numerical data in the programming mode.
4. CLEAR KEY — Used to clear the display if an error is made in the programming mode.
5. SET TEMP KEY — Used to view or program the temperature setpoint.
6. ACT TEMP KEY — Used to view the current oven temperature.
7. TIME KEY — Used to view or program the cook time.
8. PROG/ENTER KEY — Used to enter and exit the programming mode. Also used to lock in programmed settings.
9. STATUS LAMPS — When lit indicate that the fan or burners are operating.

This oven, supplied with remote control, is equipped with an emergency shut down switch. Should you need to stop the belt, fans, or heat press the emergency switch.

Do not use the emergency switch as a GENERAL on/off switch!

CONTROL OPERATION

To turn the oven on:

1. Press and hold the ON/OFF key (2). The display reads *OFF* when the oven is idle.
2. The display flashes *WAIT • LOW • SET • TIME.*
3. The FAN and HEAT status lamps (9) light. The fans begin to run. The heat rises to the programmed temperature. The conveyor belt travels at the programmed speed.

To view the cook time setting:

1. Press the TIME key (7). The LED on the key lights and the display flashes *SET • TIME.*

To display the actual oven temperature:

1. Press the ACT TEMP key (6). The LED on the key lights and the display reads *ACTUAL • °F.*

To view the temperature set point:

1. Press the SET TEMP key (5). The LED on the key lights and the display flashes *SET • TEMP • °F.*

To turn the oven off:

1. Press the ON/OFF key (2). The blower motor(s) continue to run regardless of the controller status until the temperature drops below 180°F (82°C).

PROGRAMMING PROCEDURES

Programming the Cook Time:

1. Press the PROGRAM/ENTER key (8).
2. Press the TIME key (7). The display reads *PROG-? • SET • TIME-? • _ _ _ _.*
3. Use the NUMERIC keys (3) to enter the desired cook time. The display will read the numbers as they are entered. If an error is made, press the CLEAR key (4) and re-enter the number.
4. Press the PROGRAM/ENTER key (8) a second time to lock-in the new time. The new cook time will be stored in the computer's memory.

Programming the Temperature:

1. Press the PROGRAM/ENTER key (8).
2. Press the SET TEMP key (5). The display reads *PROG-? • SET • TEMP-? • _ _ _ _ °F.*
3. Use the NUMERIC keys (3) to enter the desired temperature set point. The control displays the numbers as they are entered. If an error is made, press the CLEAR key (4) and re-enter the number.
4. Press the PROGRAM/ENTER key (8) a second time to lock-in the new temperature. The new temperature setpoint will be stored in the computer's memory.

Operation at the Programmed Settings:

1. Press and hold the ON/OFF key (2).
2. The FAN and HEAT status lamps (9) light. The fans begin to run. The heat rises to the temperature setting stored in the computer's memory. The conveyor belt begins to travel at the timed speed stored in memory.
3. The display will flash *WAIT • LOW • SET • TIME* until the programmed bake temperature is reached. The HEAT lamp (9) will remain lit until the oven reaches the temperature set point.
4. The display reads *READY* and the HEAT lamp (9) goes out.
5. The oven is now ready to accept product.
6. Press and hold the ON/OFF key (2) to turn the oven off. The fans continue to run while the oven cools to a safe temperature.

DISPLAY INFORMATION

- WAIT • *LOW* — indicates that the present oven temperature is lower than the set point temperature. When the oven reaches the set point temperature the display changes to *READY.*
- *READY* — indicates that the oven is ready to accept product.
- *SET • TEMP • mmss* — indicates the current cook time setting.
- *HIGH • TIME* — indicates that the temperature is well above the set point. This usually occurs when moving from a higher to a lower temperature. Wait until the display reads ready before loading product.
- *HIGH • TEMP • LIMIT* — indicates that the oven temperature exceeds the high limit from the 2nd level program. The Over Temperature Alarm buzzer will sound. Shut the oven off and wait for the unit to cool down.
- *HIGH • TEMP • PANEL* — indicates that the control area reaches an excessive temperature. Shut the oven off and wait for the unit to cool down. Error code generally means loose ground wire.
- *PROBE • OPEN • PROBE • SHORT* — indicates that the temperature sensor has failed. The Alarm buzzer sounds. Shut the oven off and contact a service representative.

SEQUENCE OF OPERATION

NOTE: The following instructions represent the most common configurations. For questions regarding other options call the Blodgett Service Department at (800)331-5842.

MT-70-PH DOMESTIC — M2468 REV E

NOTE: The following is also applicable to the MT3255 with 3 blower motors.

COMPONENT REFERENCE

NOTE: Refer to FIGURE 6 page 3—21 for component locations.

1. BLOWER SWITCH (M0153)
2. TEMPERATURE CONTROLLER (M3149)
3. SPST RELAY (16988)
4. MOTOR CONTACTORS A & B (M0708)
5. CONVECTION FANS (Clockwise — M4224, Counter-clockwise — M4225)
6. THERMOCOUPLES (Dual lead — M3151, Single — M3152)
7. HI/LO LIMIT BOARD (M3150)
8. HEAT SWITCH (M0152)
9. SPDT THERMAL SWITCH (M2453)
10. SINGLE SOLENOID GAS VALVE (20287)
11. PRESSURE SWITCH (M0595)
12. 220/24 VAC TRANSFORMER (M2381)
13. PURGE RELAY (M2385)
14. COMBUSTION MOTOR (M0767)
15. CENTRIFUGAL SWITCH
16. IGNITION CONTROL (M1054)
17. PILOT VALVE (LP — 22190, Natural — M5495)
18. MAIN VALVE (LP — 22190, Natural — M5495)
19. SPDT THERMAL SWITCH (M2453)
20. COOLING FANS (4-1/2" — M2469, 3-1/5" — 21134)
21. MOMENTARY SWITCH (M2497)
22. 120 VOLT RELAY (16241)
23. BUZZER
24. CONVEYOR SWITCH (M0152)
25. 10kΩ POTENTIOMETER (M3145)
26. #10 PICKUP (M3147)
27. TIME DISPLAY (M3146)
28. D.C. MOTOR (M2378)
29. D.C. SPEED CONTROL BOARD (M2379)
30. INDICATOR LIGHT (M0791)

OPERATION

1. Turn the blower switch (1) to ON. The N.O. contacts close, the N.C. contacts open. 115 VAC runs to L1 of the temperature controller (2), both coils of the motor contactors (4) and terminal #7 of the hi/lo limit board (7). Terminal #7 is an output. It remains powered after the oven is shut down to keep the convection fans (5) operating until the unit reaches 135—170°F (57—77°C) as sensed by the thermocouples (6).

   NOTE: Two thermocouples are located between the middle convection fans in the rear of the oven. One thermocouple provides DC millivolts to the Hi/Lo limit board. The other provides DC milivolts to the temperature controller. Check thermocouples with a millivolt meter.

2. Turn the heat switch (8) to ON. Power goes to the common terminal of the temperature controller (2) and terminal #5 of the Hi/Lo limit board (7). A switch is made between terminals #5 and #6 of the Hi/Lo limit board. This switch opens if the oven cavity temperature exceeds 600°F (316°C). Terminal #6 of the Hi/Lo board is an output and sends power to a pressure switch (11). The switch reacts from a vacuum created by the convection fans. If the switch is closed, power runs to the primary side of a 115/24 VAC transformer (12) and a contact on the purge relay (13).

   NOTE: These components are located in a box mounted on top of the combustion motor.

   When 24 VAC is applied to this relay, the contacts close sending 115 VAC to start the combustion motor (14). When the combustion motor reaches full speed, a centrifugal switch (15) closes sending 24 VAC to the ignition module (16). After the module's self diagnostics are complete, the pilot valve (17) opens. When a proof of flame is established, the main burner valve (18) opens.

3. Output from the temperature controller (2) goes from N.O. terminal to the common termi-

nal of a SPDT thermal switch (9). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch.

NOTE: The switch is located in the front control compartment. It protects the other components from hi ambient heat.

If this switch is cold, it should be made between common and N.C. terminals sending power to the single solenoid gas valve (10).

4. When power is applied to the coils of both motor contactors (4) the contacts close sending power to the four convection fans (5) located in the back of the oven. Power is also applied to the coil of the SPST relay (3).

   NOTE: The SPST relay acts as a hood interlock and is sometimes used as a means of starting the hood.

5. The oven has six cooling fans (19). Two on the front control panel keep the panel below 140°F (60°C). The fan's airflow is from left to right for flow through ventilation. The other four, in the rear of the oven, keep the convection fans from overheating. The cooling fans start when the motor contactor powers up and closes between terminals #13 and #14. Power goes to the N.C. terminal of a SPDT thermal switch (18). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch and may start the fans even if the oven is off. If this switch is cold, it should be made between common and N.C. terminals sending power to the cooling fans.

   NOTE: The switch is located on the ceiling of the convection fan compartment.

6. The conveyor is driven by an open loop D.C. control system consisting of a conveyor switch (23), time display (26), 10kΩ potentiometer (24), D.C. speed control board (28), 130 VDC motor (27) and #10 Hall effect pickup (25). Refer to page 5−1 for pickup troubleshooting. After the conveyor switch is turned on, the time display illuminates. The D.C. control board powers up. The output voltage measured on terminals A1 and A2 of the board to the motor varies from 20 to130 VDC based on the position of the potentiometer. The speed of the motor should also vary. The time display varies depending on the speed of the Hall effect pickup. The pickup sends an R.P.M value to the display. The display converts this value to minutes:seconds.

   NOTE: This type of system does not sense the weight of the product and will slow down slightly if the belt is fully loaded.

7. If the thermal switch (9) in the control panel toggles due to high heat, the single solenoid valve (10) closes. Power runs through a momentary switch (20) to the coil of a 115 volt relay (21). When this relay closes, a buzzer (22) sounds and an indicator lamp (29) lights, indicating a control compartment high temperature. Pressing the momentary switch disengages the relay, silencing the buzzer. The indicator lamp remains lit until the temperature drops 20°F across the face of the thermal switch, allowing the burner to refire.

MT-70-PH GENERAL EXPORT — M2501 REV D

NOTE: The following is also applicable to the MT3255 with 3 blower motors.

COMPONENT REFERENCE

NOTE: Refer to FIGURE 7 page 3—22 for component locations.

1. BLOWER SWITCH (M0153)
2. TEMPERATURE CONTROLLER (M3155)
3. SPST RELAY (16988)
4. MOTOR CONTACTORS A & B (M0708)
5. CONVECTION FANS (Clockwise — M4597, Counter-clockwise — M4598)
6. THERMOCOUPLES (Dual lead — M3151, Single — M3152)
7. HI/LO LIMIT BOARD (M3150)
8. HEAT SWITCH (M0152)
9. SPDT THERMAL SWITCH (M2453)
10. SINGLE SOLENOID GAS VALVE (M2245)
11. PRESSURE SWITCH (M0595)
12. 220/24 VAC TRANSFORMER (M2384)
13. PURGE RELAY (M2385)
14. COMBUSTION MOTOR (M2276)
15. IGNITION CONTROL (M1054)
16. PILOT VALVE (LP — 22190, Natural — M5495)
17. MAIN VALVE (LP — 22190, Natural — M5495)
18. SPDT THERMAL SWITCH (M2453)
19. COOLING FANS (4-1/2" — 23034, 3-1/5" — 21430)
20. MOMENTARY SWITCH (M2497)
21. 240 VOLT RELAY (90250)
22. BUZZER
23. CONVEYOR SWITCH (M0152)
24. 10kΩ POTENTIOMETER (M3145)
25. #10 PICKUP (M3147)
26. TIME DISPLAY (M3154)
27. D.C. MOTOR (M3128)
28. D.C. SPEED CONTROL BOARD (M3153)
29. INDICATOR LIGHT (16037)

OPERATION

1. Turn the blower switch (1) to ON. The N.O. contacts close, the N.C. contacts open. 220 or 240 VAC runs to terminal #3 of the temperature controller (2), both coils of the motor contactors (4) and terminal #7 of the hi/lo limit board (7). Terminal #7 is an output. It remains powered after the oven is shut down to keep the convection fans (5) operating until the unit reaches 135—170°F (57—77°C) as sensed by the thermocouples (6).

   NOTE: Two thermocouples are located between the middle convection fans in the rear of the oven. One thermocouple provides DC millivolts to the Hi/Lo limit board. The other provides DC milivolts to the temperature controller. Check thermocouples with a millivolt meter.

2. Turn the heat switch (8) to ON. Power goes to terminal #6 of the temperature controller (2) and terminal #5 of the Hi/Lo limit board (7). A switch is made between terminals #5 and #6 of the Hi/Lo limit board. This switch opens if the oven cavity temperature exceeds 600°F (316°C). Terminal #6 of the Hi/Lo board is an output and sends power to a pressure switch (11). The switch reacts from a vacuum created by the convection fans. If the switch is closed, power runs to the primary side of a 220/24 VAC transformer (12) and a contact on the purge relay (13).

   NOTE: These components are located in a box mounted on top of the combustion motor.

   When 24 VAC is applied to this relay, the contacts close sending 220 VAC to start the combustion motor (14). The relay also sends power to terminal #2 of the ignition control system (15). After the module's self diagnostics are complete, the pilot valve (16) opens. When a proof of flame is established, the main burner valve (17) opens.

3. Output from the temperature controller (2) goes from terminal #4 to the common terminal of a SPDT thermal switch (9). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch.

NOTE: The switch is located in the front control compartment. It protects the other components from hi ambient heat.

If this switch is cold, it should be made between common and N.C. terminals sending power to the single solenoid gas valve (10).

4. When power is applied to the coils of both motor contactors (4) the contacts close sending power to the four convection fans (5) located in the back of the oven. Power is also applied to the coil of the SPST relay (3).

   NOTE: The SPST relay acts as a hood interlock and is sometimes used as a means of starting the hood.

5. The oven has six cooling fans (19). Two on the front control panel keep the panel below 140°F (60°C). The fan's airflow is from left to right for flow through ventilation. The other four, in the rear of the oven, keep the convection fans from overheating. The cooling fans start when the motor contactor powers up and closes between terminals #5 and #6. Power goes to the N.C. terminal of a SPDT thermal switch (18). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch and may start the fans even if the oven is off. If this switch is cold, it should be made between common and N.C. terminals sending power to the cooling fans.

   NOTE: The switch is located on the ceiling of the convection fan compartment.

6. The conveyor is driven by an open loop D.C. control system consisting of a conveyor switch (23), time display (26), potentiometer (24), D.C. speed control board (28), 180 VDC motor (27) and #10 Hall effect pickup (25). Refer to page 5—1 for pickup troubleshooting. After the conveyor switch is turned on, the time display illuminates. The D.C. control board powers up. The output voltage measured on the A1 and A2 of the board to the motor varies from 20 to180 VDC based on the position of the potentiometer. The speed of the motor should also vary. The time display varies depending on the speed of the Hall effect pickup. The pickup sends an R.P.M value to the display. The display converts this value to minutes:seconds.

   NOTE: This type of system does not sense the weight of the product and will slow down slightly if the belt is fully loaded.

7. If the thermal switch (9) in the control panel toggles due to high heat, the single solenoid valve (10) closes. Power runs through a momentary switch (20) to the coil of a 240 volt relay (21). When this relay closes, a buzzer (22) sounds and an indicator lamp (29) lights, indicating a control compartment high temperature. Pressing the momentary switch disengages the relay, silencing the buzzer. The indicator lamp remains lit until the temperature drops 20°F across the face of the thermal switch, allowing the burner to refire.

MT3270 WITH STANDARD CONTROLS — 21575 REV E

NOTE: The following is also applicable to the MT3255 with 3 blower motors.

COMPONENT REFERENCE

NOTE: Refer to FIGURE 8 page 3—23 for component locations.

1. BLOWER SWITCH (M0153)
2. TEMPERATURE CONTROLLER (M3149)
3. MOTOR CONTACTOR A & B (M0708)
4. THERMOCOUPLES (Dual lead — M3151, Single — M3152)
5. HI/LO LIMIT BOARD (M3150)
6. CONVECTION FANS (Clockwise — M4224, Counter-clockwise — M4225)
7. HEAT SWITCH (M0152)
8. COMBUSTION MOTOR (22132)
9. PRESSURE SWITCH (M0595)
10. 110/24 VAC TRANSFORMER (M2381)
11. PURGE RELAY (M2382)
12. CENTRIFUGAL SWITCH
13. IGNITION MODULE (M1054)
14. PILOT VALVE (LP — 22190, Natural — M5495)
15. MAIN VALVE (LP — 22190, Natural — M5495)
16. SPST THERMAL SWITCH (M1362)
17. SINGLE SOLENOID GAS VALVE (20287)
18. COOLING FANS (4-1/2" — M2469, 3-1/5" — 21134)
19. SPST THERMAL SWITCH (M0635)
20. CONVEYOR SWITCH (M0152)
21. TIME DISPLAY (M3146)
22. 10KΩ POTENTIOMETER (M3145)
23. D.C. SPEED CONTROL BOARD (M2379)
24. 130 VDC MOTOR (M2378)
25. #10 PICK UP (M3147)

OPERATION

1. Turn the blower switch (1) to ON. The N.O. contacts close, the N.C. contacts open. 115 VAC runs to terminal #1 of the temperature controller (2), both coils of the motor contactors (3) and terminal #7 of the hi/lo limit board (5). Terminal #7 is an output. It remains powered after the oven is shut down to keep the convection fans (6) operating until the unit reaches 135—170°F (57—77°C) as sensed by the thermocouples (4).

   NOTE: Two thermocouples are located between the middle convection fans in the rear of the oven. One thermocouple provides DC millivolts to the Hi/Lo limit board. The other provides DC milivolts to the temperature controller. Check thermocouples with a millivolt meter.

2. Turn the heat switch (7) to ON. Power goes to terminal #6 of the temperature controller (2) and terminal #5 of the Hi/Lo limit board (5). A circuit is made between terminals #5 and #6 of the Hi/Lo limit board. This switch opens if the oven cavity temperature exceeds 600°F (316°C) as sensed by the thermocouples. Terminal #6 of the Hi/Lo board is an output and sends power to a pressure switch (9). The switch reacts from a vacuum created by the convection fans. If the switch is closed, power runs to the primary side of a 115/24 VAC transformer (10) and a contact on the purge relay (11).

   NOTE: These components are located in a box mounted on top of the combustion motor.

   When 24 VAC is applied to this relay, the contacts close sending 115 VAC to start the combustion motor (8). When the combustion motor reaches full speed, a centrifugal switch (12) closes sending 24 VAC to the ignition module (13). After the module's self diagnostics are complete, the pilot valve (14) opens. When a proof of flame is established, the main burner valve (15) opens.

3. Output from the temperature controller (2) goes from terminal #4 to a terminal of a SPDT thermal switch (16). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch.

NOTE: The switch is located in the front control compartment. It protects the other components from hi ambient heat.

If this switch is cold, it should be closed sending power to the single solenoid gas valve (17).

4. When power is applied to the coils of both motor contactors (3) the contacts close sending power to the four convection fans (6) located in the back of the oven.

5. The oven has six cooling fans (18). Two on the front control panel keep the panel below 140°F (60°C). The fan's airflow is from left to right for flow through ventilation. The other four, in the rear of the oven, keep the convection fans from overheating. The cooling fans start when the SPST thermal switch (19) closes. The switch toggles if the temperature passing its face exceeds the rating on the back of the switch.

   NOTE: The switch is located on the ceiling of the convection fan compartment.

6. The conveyor is driven by an open loop D.C. control system consisting of a conveyor switch (20), time display (21), 10kΩ potentiometer (22), D.C. speed control board (23), 130 VDC motor (24) and #10 Hall effect pickup (25). Refer to page 5—1 for pickup troubleshooting. After the conveyor switch is turned on, the time display illuminates. The D.C. control board powers up. The output voltage measured at A1 and A2 of the board to the motor varies from 20 to130 VDC based on the position of the potentiometer. The speed of the motor should also vary. The time display varies depending on the speed of the Hall effect pickup. The pickup sends an R.P.M value to the display. The display converts this value to minutes:seconds.

   NOTE: This type of system does not sense the weight of the product and will slow down slightly if the belt is fully loaded.

MT3270 TWIN BELT WITH REMOTE CONTROLS — M4410 REV A

COMPONENT REFERENCE

NOTE: Refer to FIGURE 9 page 3—24 for component locations.

1. COMPUTER (FW525)
2. BLOWER RELAY (22672)
3. MAIN CONTROL RELAY (22672)
4. BURNER VALVE RELAY (22672)
5. SPEED CONTROL BOARDS A & B (M2379)
6. SPST THERMAL SWITCH (M1362)
7. MANUAL RESETABLE HI LIMIT (M3295)
8. PRESSURE SWITCH (M0595)
9. 115/24 VAC TRANSFORMER (M2381)
10. PURGE RELAY (M2382)
11. COMBUSTION MOTOR (22132)
12. CENTRIFUGAL SWITCH
13. IGNITION CONTROL SYSTEM (M1054)
14. PILOT VALVE (LP — 22190, Natural — M5495)
15. MAIN VALVE (LP — 22190, Natural — M5495)
16. MOTOR CONTACTOR (M0708)
17. CONVECTION FANS (Clockwise — M4224, Counter-clockwise — M4225)
18. COOLING FANS (4-1/2" — M2469, 3-1/5" — 21134)
19. SPDT THERMAL SWITCH (M2453)
20. D.C. MOTOR (M2378)
21. RTD PROBE (M7427)
22. EMERGENCY SHUTDOWN SWITCH (M0152)

OPERATION

1. Apply power to the oven. Program the time and temperature into the computer (1). The burner valve relay (4), blower relay (2) and main control relay (3) energize powering up the oven.

2. The main control relay (3) sends power to the front and rear speed control boards (5) and the SPST thermal switch (6). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch. If the thermal switch is closed, power is supplied to the manual reset high limit switch (7). The high limit switch is a bulb and capillary style switch. It reacts when the oven cavity temperature exceeds the high limit programmed into the cooking computer.

   If the high limit switch is closed power flows to the convection fan pressure switch (8). The switch reacts from a vacuum created by the convection fans.

   If the pressure switch is closed, power runs to the primary side of a 115/24 VAC transformer (9) and a contact on the purge relay (10). These components are located in a box mounted on top of the combustion motor.

   When 24 VAC are applied to the purge relay, the contacts close sending 115 VAC to start the combustion motor (11). When the combustion motor reaches full speed, a centrifugal switch (12) closes sending 24 VAC to the ignition module (13). After the module's self diagnostics are complete, the pilot valve (14) opens. When a proof of flame is established, the ignition control module (13) sends 24 VAC to terminal #6 of the burner valve relay (4). If this relay is closed on a call for heat, as sensed by an RTD probe, a circuit is completed between terminal #6 and #5 sending 24 VAC to the main valve (15).

   NOTE: The RTD probe is located between the two middle convection fans in the rear of the oven. Check the probe with an ohm meter.

3. The blower relay (2) sends 115 volts to the coil of the motor contactor (16) starting the four convection fans (18) in the rear of the oven. This contactor also supplies power to the N.C. terminal of a SPDT thermal switch (19). The switch toggles if the temperature passing its

face exceeds the rating on the back of the switch and may start the fans even if the oven is off. If this switch is cold, it should be made between common and N.C. terminals sending power to the cooling fans (18).

NOTE: The SPDT thermal switch is located in the ceiling of the convection fan compartment.

4. The conveyors are driven by an open loop DC control system consisting of two DC speed control boards (5), two 130 VDC motors (20) and the DAC located in the cooking computer (1). If a time is programmed into the cooking computer, a voltage ranging between .47 and 4.7 is applied to the DC speed control boards. The output voltage measured at A1 and A2 of the boards to the motors varies from 20 to130 VDC based on the DAC voltage applied to the board or the time programmed into the computer.

NOTE: The DAC receives 20 VDC from the speed control boards. The DAC returns a portion of the voltage (between .47 and 4.7 VDC). The amount of voltage is dependent on the time programmed into the computer.

NOTE: This type of system does not sense the weight of the product and will slow down slightly if the belt is fully loaded.

NOTE: This oven, supplied with remote control, is equipped with an emergency shut down switch. Should you need to stop the belt, fans, or heat press the emergency switch. ***Do not use the emergency switch as a GENERAL on/off switch!***

MT3270 WITH CLOSED LOOP — M4206 REV B

NOTE: The following is also applicable to the MT3255 with 3 blower motors.

COMPONENT REFERENCE

NOTE: Refer to FIGURE 10 page 3—25 for component locations.

1. BLOWER SWITCH (M0153)
2. TEMPERATURE CONTROL (M3149)
3. MOTOR CONTACTORS A & B (M0708)
4. HI/LO LIMIT BOARD (M3150)
5. CONVECTION FANS (Clockwise — M4224, Counter-clockwise — M4225)
6. THERMOCOUPLES (Dual lead — M3151, Single — M3152)
7. HEAT SWITCH (M0152)
8. COMBUSTION MOTOR (22132)
9. PRESSURE SWITCH (M0595)
10. 115/24 TRANSFORMER (M2381)
11. PURGE RELAY (M2382)
12. CENTRIFUGAL SWITCH
13. IGNITION CONTROL MODULE (M1054)
14. PILOT VALVE (LP — 22190, Natural — M5495)
15. MAIN VALVE (LP — 22190, Natural — M5495)
16. SPST THERMAL SWITCH (M1362)
17. SINGLE SOLENOID GAS VALVE (20287)
18. COOLING FANS (4-1/2" — M2469, 3-1/5" — 21134)
19. SPDT THERMAL SWITCH (M2453)
20. CONVEYOR SWITCH (M0152)
21. D.C. MOTOR (M2378)
22. TIME DISPLAY/MOTOR DRIVE (M3393)
23. #2 HALL EFFECT PICKUP (M0984)

OPERATION

1. Turn the blower switch (1) to ON. The N.O. contacts close, the N.C. contacts open. 115 VAC runs to terminal #1 of the temperature controller (2), both coils of the motor contactors (3) and terminal #7 of the hi/lo limit board (4). Terminal #7 is an output. It remains powered after the oven is shut down to keep the convection fans (5) operating until the unit reaches 135—170°F (57—77°C) as sensed by the thermocouples (6).

   NOTE: Two thermocouples are located between the middle convection fans in the rear of the oven. One thermocouple provides DC millivolts to the Hi/Lo limit board. The other provides DC milivolts to the temperature controller. Check thermocouples with a millivolt meter.

2. Turn the heat switch (7) to ON. Power goes to terminal #6 of the temperature controller (2) and terminal #5 of the Hi/Lo limit board (4). A circuit is made between terminals #5 and #6 of the Hi/Lo limit board. This switch opens if the oven cavity temperature exceeds 600°F (316°C) as sensed by the thermocouples. Terminal #6 of the Hi/Lo board is an output and sends power to a pressure switch (9). The switch reacts from a vacuum created by the convection fans. If the switch is closed, power runs to the primary side of a 115/24 VAC transformer (10) and a contact on the purge relay (11).

   NOTE: These components are located in a box mounted on top of the combustion motor.

   When 24 VAC is applied to this relay, the contacts close sending 115 VAC to start the combustion motor (8). When the combustion motor reaches full speed, a centrifugal switch (12) closes sending 24 VAC to the ignition module (13). After the module's self diagnostics are complete, the pilot valve (14) opens. When a proof of flame is established, the main burner valve (15) opens.

3. Output from the temperature controller (2) goes from terminal #4 to a terminal of a SPST thermal switch (16). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch.

NOTE: The switch is located in the front control compartment. It protects the other components from hi ambient heat.

If this switch is cold, it should be closed sending power to the single solenoid gas valve (17).

4. When power is applied to the coils of both motor contactors (3) the contacts close sending power to the four convection fans (5) located in the back of the oven.

5. The oven has six cooling fans (18). Two on the front control panel keep the panel below 140°F (60°C). The fan's airflow is from left to right for flow through ventilation. The other four, in the rear of the oven, keep the convection fans from overheating. The cooling fans start when the motor contactor powers up and closes between terminals #13 and #14. Power goes to the N.C. terminal of a SPDT thermal switch (19). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch and may start the fans even if the oven is off. If this switch is cold, it should be made between common and N.C. terminals sending power to the cooling fans.

   NOTE: The switch is located on the ceiling of the convection fan compartment.

6. The conveyor belt is driven by a closed loop D.C. drive system consisting of a conveyor switch (20), 130 VDC motor (21), time display and motor drive (22) and a #2 Hall effect pickup (23). Refer to page 5—1 for pickup troubleshooting. The motor speed varies based on the time programmed into the digital time display. To slow the belt down, press the down arrow key. To increase belt speed, press the up arrow key.

   NOTE: When this component is replaced it must be reprogrammed for the appropriate tunnel length. Reference Calibration section page 4—4.

   NOTE: This system senses the weight of the product and compensates by increasing the voltage output.

MT3255E — M4289 REV B

COMPONENT REFERENCE

NOTE: Refer to FIGURE 11 page 3—26 for component locations.

1. BLOWER SWITCH (M0153)
2. TEMPERATURE CONTROLLER (M3155)
3. MOTOR CONTACTORS (M0708)
4. HI/LO LIMIT BOARD (M3150)
5. CONVECTION FANS (Clockwise — M4597, Counter-clockwise — M4598)
6. THERMOCOUPLES (Dual lead — M3151, Single — M3152)
7. HEAT SWITCH (M0152)
8. SPST THERMAL SWITCH (M1362)
9. ELEMENT CONTACTORS (M2247)
10. HEATING ELEMENTS (220 — M5282, 240 — M5281)
11. COOLING FANS (4-1/2" — 23034, 3-1/2" — 21430)
12. SPDT THERMAL SWITCH (M2453)
13. CONVEYOR SWITCH (M0152)
14. D.C. MOTOR (M2378)
15. TIME DISPLAY/MOTOR DRIVE (M3393)
16. #2 HALL EFFECT PICKUP (M0984)

OPERATION

1. Turn the blower switch (1) to ON. The N.O. contacts close, the N.C. contacts open. 115 VAC runs to L1 of the temperature controller (2), both coils of the motor contactors (3) and terminal #7 of the hi/lo limit board (4). Terminal #7 is an output. It remains powered after the oven is shut down to keep the convection fans (5) operating until the unit reaches 135—170°F (57—77°C) as sensed by the thermocouples (6).

   NOTE: Two thermocouples are located between two of the convection fans in the rear of the oven. One thermocouple provides DC millivolts to the Hi/Lo limit board. The other provides DC milivolts to the temperature controller. Check thermocouples with a millivolt meter.

2. Turn the heat switch (7) to ON. Power goes to the N.O. terminal of the temperature controller (2). On a call for heat the temperature controller closes a switch between the N.O. and common terminals. Power is sent to one side of a SPST thermal switch (8). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch.

   NOTE: The switch is located in the front control compartment. It protects the other components from hi ambient heat.

   If this switch is cold it should be closed, sending power to terminal #5 of the hi/lo limit board. A switch is made between terminals #5 and #6 of the Hi/Lo limit board. This switch opens if the oven cavity temperature exceeds 600°F (316°C). Terminal #6 of the Hi/Lo board is an output and sends power to the coil of the element contactor. When the element contactor closes it sends power to the heating elements.

3. The oven has six cooling fans (11). Two on the front control panel keep the panel below 140°F (60°C). The fan's airflow is from left to right for flow through ventilation. The other four, in the rear of the oven, keep the convection fans (5) from overheating. The cooling fans start when the motor contactor powers up and closes between terminals #5 and #6. Power goes to the N.C. terminal of a SPDT thermal switch (12). The switch toggles if the temperature passing its face exceeds the rating on the back of the

switch and may start the fans even if the oven is off. If this switch is cold, it should be made between common and N.C. terminals sending power to the cooling fans.

NOTE: The switch is located on the ceiling of the convection fan compartment.

4. The conveyor belt is driven by a closed loop D.C. drive system consisting of a conveyor switch (13), 130 VDC motor (14), time display and motor drive (15) and a #2 Hall effect pick-up (16). Refer to page 5—1 for pickup troubleshooting. The motor speed varies based on the time programmed into the digital time display. To slow the belt down, press the down arrow key. To increase belt speed, press the up arrow key.

NOTE: When this component is replaced it must be reprogrammed for the appropriate tunnel length. Reference Calibration section page 4—4.

NOTE: This system senses the weight of the product and compensates by increasing the voltage output.

MT3270 CE — M8296 REV A

NOTE: The following is also applicable to the MT3255 with 3 blower motors.

COMPONENT REFERENCE

NOTE: Refer to FIGURE 12 page 3—27 for component locations.

1. BLOWER SWITCH (M0153)
2. TEMPERATURE CONTROLLER (M3155)
3. MOTOR CONTACTOR (M2247)
4. SPST RELAY/HOOD INTERLOCK(16998)
5. HI/LO LIMIT BOARD (M3150)
6. CONVECTION FANS (Clockwise — M4597, Counter-clockwise — M4598)
7. THERMOCOUPLES (Dual lead — M3151, Single — M3152)
8. HEAT SWITCH (M0152)
9. CONVECTION PRESSURE SWITCH (M0595)
10. COMBUSTION MOTOR (M2386)
11. BURNER PRESSURE SWITCH (M3330)
12. TPDT RELAY/LATCHING RELAY (M6519)
13. 10 SECOND PURGE TIMER (M3173)
14. SPST RELAY (16775)
15. SPDT THERMAL SWITCH (M2453)
16. IGNITION CONTROL MODULE/ LANDIS & GYR (M3168)
17. 2 SECOND PURGE TIMER (M3172)
18. PILOT VALVE (LP — M6001, Natural — M6000)
19. MAIN VALVE (LP — M6001, Natural — M6000)
20. IGNITION ALARM LIGHT (16037)
21. COOLING FANS (4-1/2" — 23034, 3-1/2" — 21430)
22. SPDT THERMAL SWITCH (M2453)
23. CONVEYOR SWITCH (M0152)
24. TIME DISPLAY (M3154)
25. 10KΩ POTENTIOMETER (M3145)
26. D.C. SPEED CONTROL BOARD (M3153)
27. 180 VDC MOTOR (M3128)
28. #10 HALL EFFECT PICKUP (M3147)
29. MOMENTARY SWITCH (M2497)
30. BUZZER
31. INDICATOR LAMP (16037)
32. TPDT RELAY (90250)

OPERATION

1. Turn the blower switch (1) to ON. The N.O. contacts close, the N.C. contacts open. 220 or 240 VAC runs to terminal #3 of the temperature controller (2), both coils of the motor contactors (3) and terminal #7 of the hi/lo limit board (5). Terminal #7 is an output. It remains powered after the oven is shut down to keep the convection fans (6) operating until the unit reaches 135—170°F (57—77°C) as sensed by the thermocouples (7).

   NOTE: Two thermocouples are located between the middle convection fans in the rear of the oven. One thermocouple provides DC millivolts to the Hi/Lo limit board. The other provides DC milivolts to the temperature controller. Check thermocouples with a millivolt meter.

2. Turn the heat switch (8) to ON. Power goes to terminal #6 of the temperature controller (2) and terminal #5 of the Hi/Lo limit board (5). A switch is made between terminals #5 and #6 of the Hi/Lo board. This switch opens if the oven cavity temperature exceeds 600°F (316°C). Terminal #6 of the Hi/Lo board is an output and sends power to a convection pressure switch (9). The switch reacts from a vacuum created by the convection fans. If the switch is closed, power runs to the combustion motor (10), the common terminal of the burner pressure switch (11), and terminal #7 of a TPDT relay (12).

   NOTE: This relay acts as a latching relay and remains powered up even after the burner pressure switch changes state.

   The burner pressure switch should be made between common and N.C., sending power to terminal #4 and the coil of the latching relay.

3. When the combustion motor (10) reaches full speed, the burner pressure switch (11) toggles between common and N.C. to common and N.O. Power goes to terminal #9 of the latching relay (12). This relay is latched due to voltage passing from terminal #7 through a set of closed contacts to terminal #4 to its coil. A set of contacts are also closed between terminals #9 and #6 of the same relay, sending power to a 10 second purge timer (13). When the tim-

er times out, power goes to the coil of a SPST relay (14), allowing its contacts to close.

4. On a call for heat from the temperature controller (2), as sensed by the thermocouples, a set of contacts closes sending power out of terminal #4 of the temperature controller to the common terminal of the SPDT thermal switch (15). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch.

   NOTE: The switch is located in the front control compartment. It protects the other components from hi ambient heat.

   If this switch is cold, it should be made between common and N.C. terminals sending power to one side of the SPST relay (14). This relay was closed shortly after the 10 second purge timer (13) timed out. Power is sent to terminal #1 of the Landis and Gyr ignition control system (16). Terminal #8 of the ignition control module is an output. It sends power to a 2 second purge timer (17) and the pilot valve (18). The main valve (19) opens when the 2 second purge timer times out. If the ignition control senses a flame the system remains energized. If not, the control locks out within 1 to 3 seconds. The ignition alarm light (20) illuminates.

   NOTE: This system is polarity specific. If the unit locks out repeatedly and the D.C. microamps are within the acceptable range, check for proper polarity.

5. When power is applied to the coils of both motor contactors (3) the contacts close sending power to the four convection fans (6) located in the back of the oven. Power is also applied to the coil of the SPST relay (4).

   NOTE: The SPST relay acts as a hood interlock and is sometimes used as a means of starting the hood.

6. The oven has six cooling fans (21). Two on the front control panel keep the panel below 140°F (60°C). The fan's airflow is from left to right for flow through ventilation. The other four, in the rear of the oven, keep the convection fans from overheating. The cooling fans start when the motor contactor powers up and closes between terminals #3 and #4. Power goes to the N.C. terminal of a SPDT thermal switch (22). The switch toggles if the temperature passing its face exceeds the rating on the back of the switch and may start the fans even if the oven is off. If this switch is cold, it should be made between common and N.C. terminals sending power to the cooling fans.

   NOTE: The switch is located on the ceiling of the convection fan compartment.

7. The conveyor is driven by an open loop D.C. control system consisting of a conveyor switch (23), time display (24), 10kΩ potentiometer (25), D.C. speed control board (26), 180 VDC motor (27) and #10 Hall effect pickup (28). Refer to page 5—1 for pickup troubleshooting. After the conveyor switch is turned on, the time display illuminates. The D.C. control board powers up. The output voltage measured on terminals A1 and A2 of the board to the motor varies from 20 to180 VDC based on the position of the potentiometer. The speed of the motor should also vary. The time display varies depending on the speed of the Hall effect pickup. The pickup sends an R.P.M value to the display. The display converts this value to minutes:seconds.

   NOTE: This type of system does not sense the weight of the product and will slow down slightly if the belt is fully loaded.

8. If the thermal switch (15) in the control panel toggles due to high heat power is interrupted to the ignition control system. Power runs through a momentary switch (29) to the coil of a 220 or 240 volt relay (32). When this relay closes, a buzzer (30) sounds and an indicator lamp (31) lights, indicating a control compartment high temperature. Pressing the momentary switch disengages the relay, silencing the buzzer. The indicator lamp remains lit until the temperature drops 20°F (11°C) across the face of the thermal switch, allowing the burner to refire.

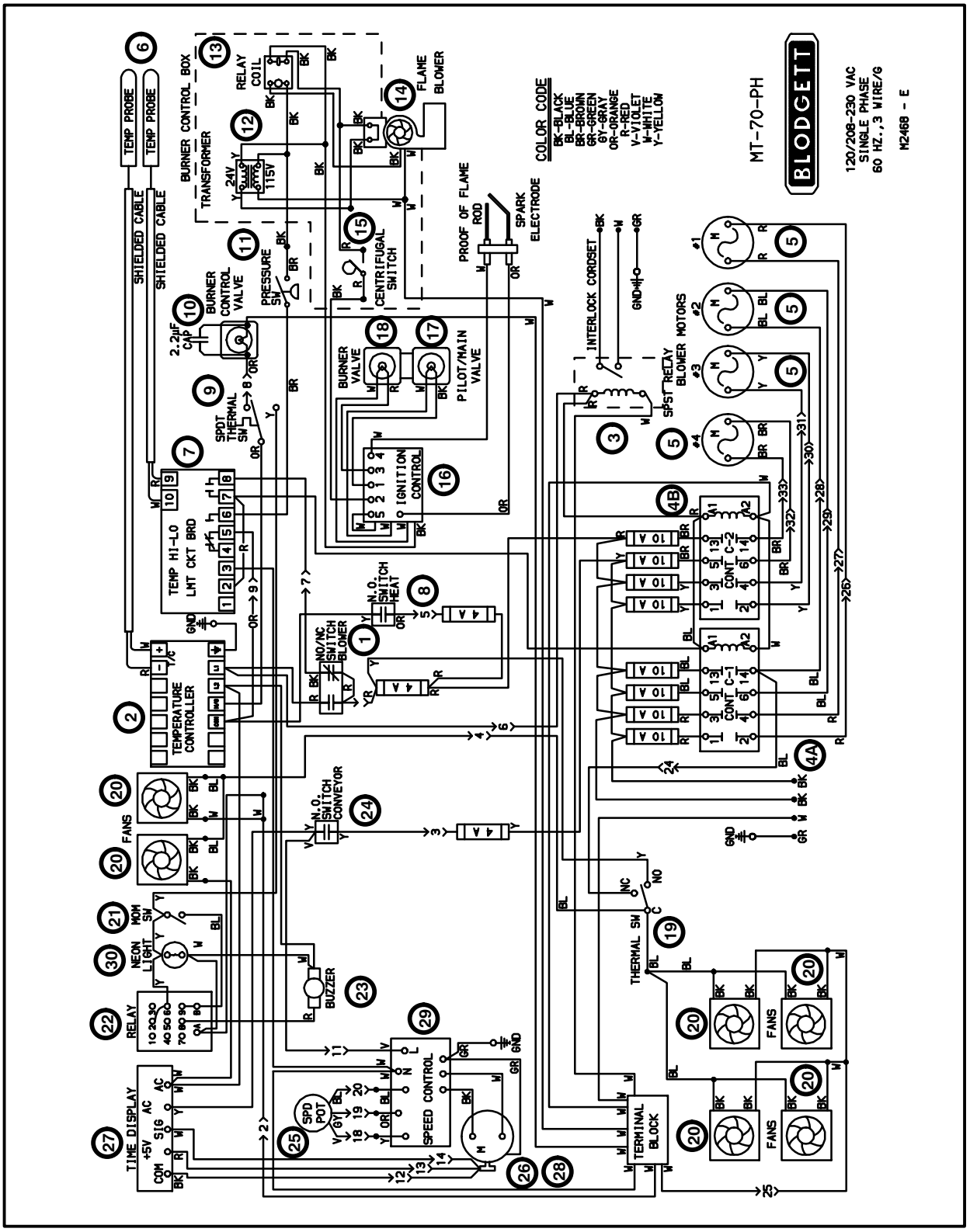

MT-70-PH
BLODGETT
120/208-230 VAC
SINGLE PHASE
60 HZ.,3 WIRE/G
M2468 - E
COLOR CODE
BK-BLACK
BL-BLUE
BR-BROWN
GR-GREEN
GY-GRAY
OR-ORANGE
R-RED
V-VIOLET
W-WHITE
Y-YELLOW
TEMP PROBE
TEMP PROBE
SHIELDED CABLE
SHIELDED CABLE
BURNER CONTROL BOX
TRANSFORMER
RELAY COIL
FLAME BLOWER
PROOF OF FLAME ROD
SPARK ELECTRODE
INTERLOCK CORDSET
GND
SPST RELAY BLOWER MOTORS
BURNER CONTROL VALVE
PRESSURE SW
CENTRIFUGAL SWITCH
2.2µF CAP
SPDT THERMAL SW
BURNER VALVE
PILOT/MAIN VALVE
IGNITION CONTROL
TEMP HI-LO LMT CKT BRD
TEMPERATURE CONTROLLER
N.O. SWITCH HEAT
NO/NC SWITCH BLOWER
N.O. SWITCH CONVEYOR
FANS
MOM SW
NEON LIGHT
RELAY
BUZZER
TIME DISPLAY
SPD POT
SPEED CONTROL
THERMAL SW
TERMINAL BLOCK
CONT C-2
CONT C-1

FIGURE 6

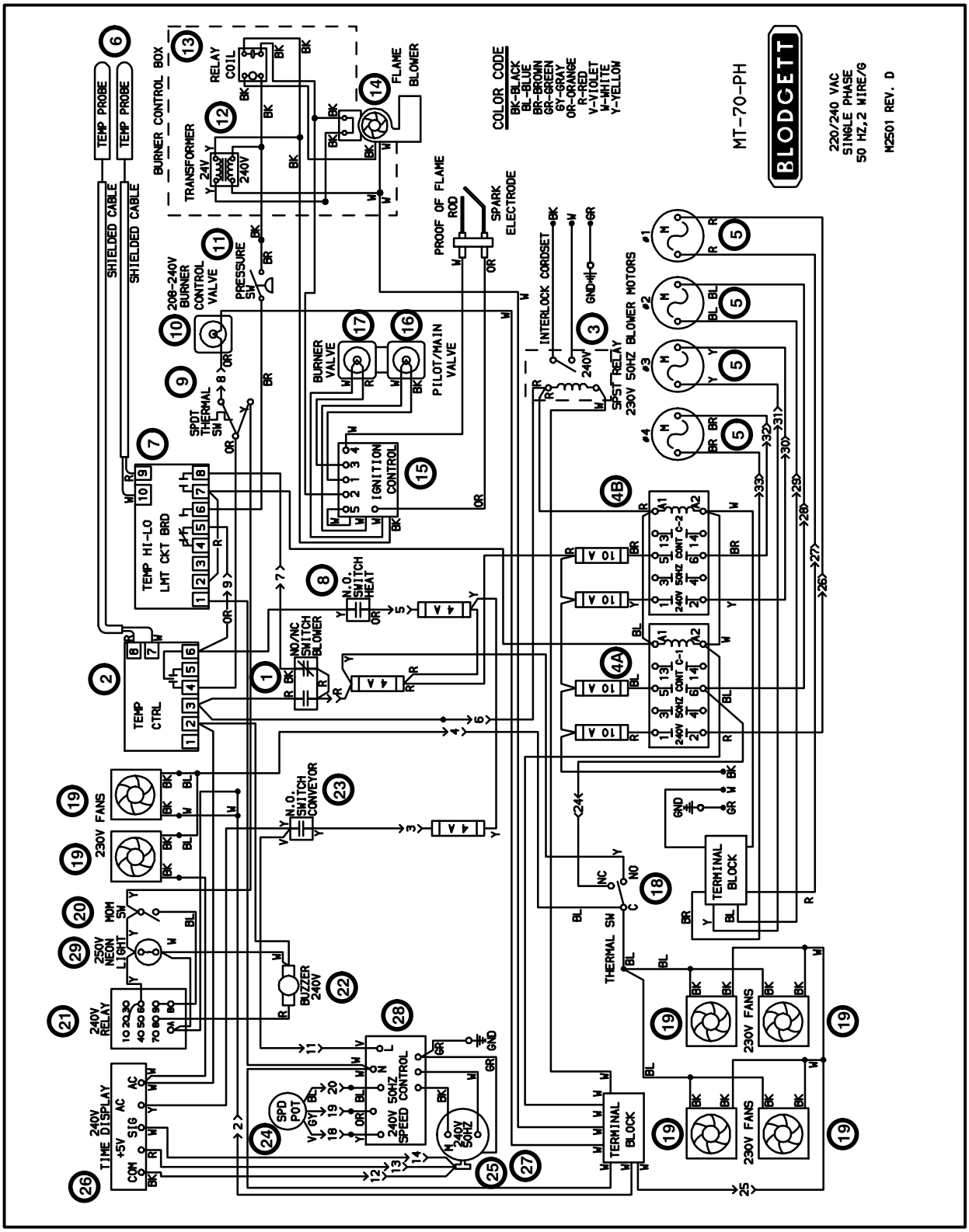

MT-70-PH
BLODGETT
220/240 VAC
SINGLE PHASE
50 HZ,2 WIRE/G
M2501 REV. D
COLOR CODE
BK-BLACK
BL-BLUE
BR-BROWN
GR-GREEN
GY-GRAY
OR-ORANGE
R-RED
V-VIOLET
W-WHITE
Y-YELLOW
TEMP PROBE
TEMP PROBE
SHIELDED CABLE
SHIELDED CABLE
BURNER CONTROL BOX
TRANSFORMER
RELAY COIL
FLAME BLOWER
PROOF OF FLAME ROD
SPARK ELECTRODE
208-240V BURNER CONTROL VALVE
PRESSURE SW
SPDT THERMAL SW
BURNER VALVE
PILOT/MAIN VALVE
IGNITION CONTROL
INTERLOCK CORDSET
SPST RELAY 230V 50HZ
BLOWER MOTORS
TEMP HI-LO LMT CKT BRD
TEMP CTRL
N.O. SWITCH HEAT
NO/NC SWITCH BLOWER
N.O. SWITCH CONVEYOR
FANS
230V FANS
MOM SW
250V NEON LIGHT
240V RELAY
BUZZER 240V
TIME DISPLAY
SPD POT
240V 50HZ SPEED CONTROL
240V 50HZ
TERMINAL BLOCK
THERMAL SW
GND

FIGURE 7

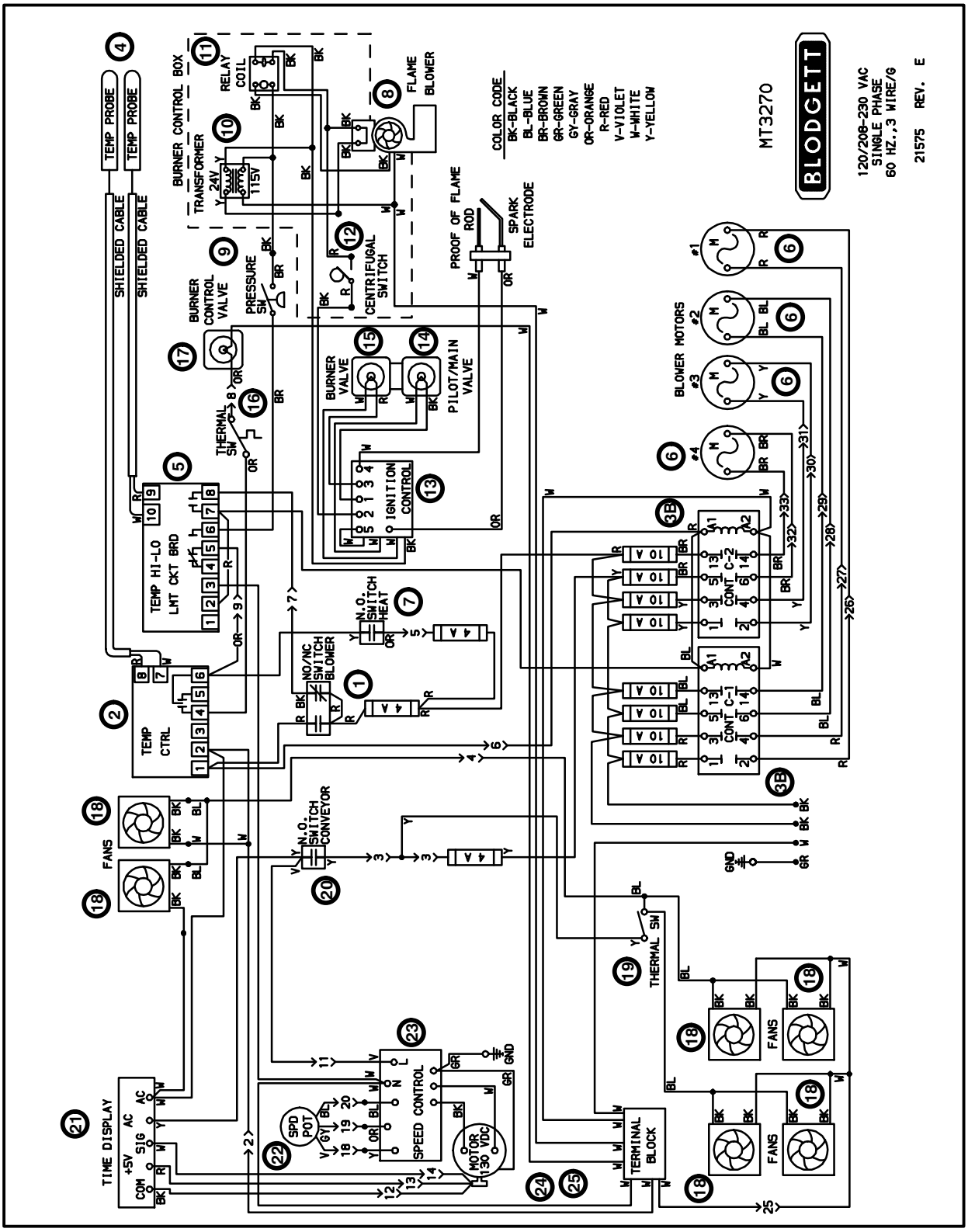

MT3270
BLODGETT
120/208-230 VAC
SINGLE PHASE
60 HZ.,3 WIRE/G
21575 REV. E
COLOR CODE
BK-BLACK
BL-BLUE
BR-BROWN
GR-GREEN
GY-GRAY
OR-ORANGE
R-RED
V-VIOLET
W-WHITE
Y-YELLOW
TEMP PROBE
TEMP PROBE
SHIELDED CABLE
SHIELDED CABLE
BURNER CONTROL BOX
RELAY COIL
TRANSFORMER
24V
115V
FLAME BLOWER
BURNER CONTROL VALVE
PRESSURE SW
CENTRIFUGAL SWITCH
PROOF OF FLAME ROD
SPARK ELECTRODE
BURNER VALVE
PILOT/MAIN VALVE
THERMAL SW
IGNITION CONTROL
BLOWER MOTORS
#1
#2
#3
#4
TEMP HI-LO LMT CKT BRD
TEMP CTRL
N.O. SWITCH HEAT
NO/NC SWITCH BLOWER
N.O. SWITCH CONVEYOR
CONT C-2
CONT C-1
FANS
GND
THERMAL SW
TERMINAL BLOCK
TIME DISPLAY
+5V
COM
SIG
AC
AC
SPD POT
SPEED CONTROL
MOTOR 130 VDC

FIGURE 8

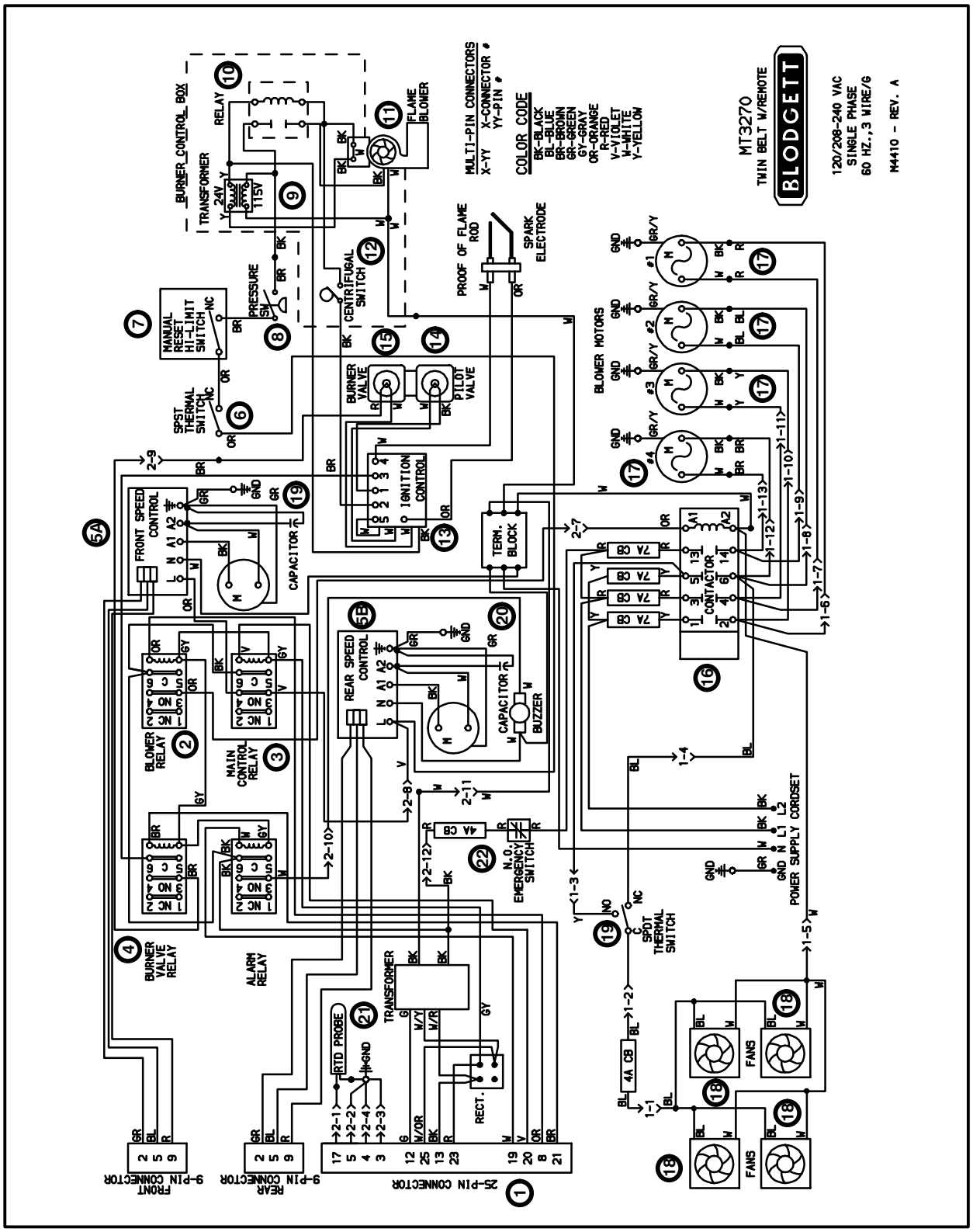

BURNER CONTROL BOX
TRANSFORMER
RELAY
FLAME BLOWER
CENTRIFUGAL SWITCH
PRESSURE SW
MANUAL RESET HI-LIMIT SWITCH
SPST THERMAL SWITCH
BURNER VALVE
PILOT VALVE
PROOF OF FLAME ROD
SPARK ELECTRODE
IGNITION CONTROL
FRONT SPEED CONTROL
REAR SPEED CONTROL
CAPACITOR
BUZZER
TERM. BLOCK
CONTACTOR
BLOWER MOTORS
#1
#2
#3
#4
FANS
BLOWER RELAY
MAIN CONTROL RELAY
BURNER VALVE RELAY
ALARM RELAY
TRANSFORMER
RTD PROBE
RECT.
N.O. EMERGENCY SWITCH
SPDT THERMAL SWITCH
POWER SUPPLY CORDSET
GND N L1 L2
MULTI-PIN CONNECTORS
X-YY X-CONNECTOR #
YY-PIN #
COLOR CODE
BK-BLACK
BL-BLUE
BR-BROWN
GR-GREEN
GY-GRAY
OR-ORANGE
R-RED
V-VIOLET
W-WHITE
Y-YELLOW
MT3270
TWIN BELT W/REMOTE
BLODGETT
120/208-240 VAC
SINGLE PHASE
60 HZ.,3 WIRE/G
M4410 - REV. A
FRONT 9-PIN CONNECTOR
REAR 9-PIN CONNECTOR
25-PIN CONNECTOR

FIGURE 9

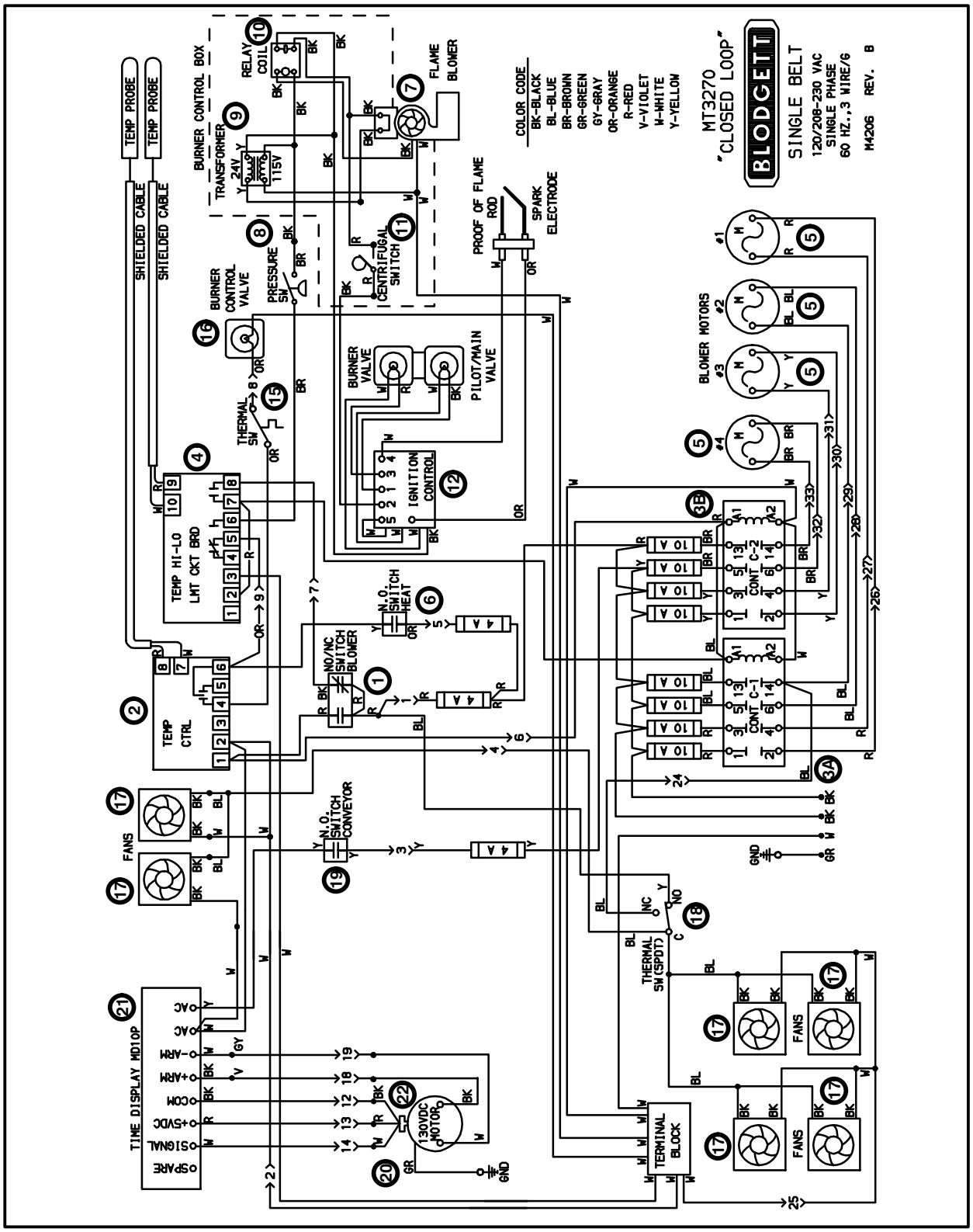

MT3270
"CLOSED LOOP"
SINGLE BELT
120/208-230 VAC
SINGLE PHASE
60 HZ.,3 WIRE/6
M4206 REV. B
COLOR CODE
BK-BLACK
BL-BLUE
BR-BROWN
GR-GREEN
GY-GRAY
OR-ORANGE
R-RED
V-VIOLET
W-WHITE
Y-YELLOW
BURNER CONTROL BOX
TRANSFORMER
24V
115V
RELAY COIL
FLAME BLOWER
PRESSURE SW
CENTRIFUGAL SWITCH
PROOF OF FLAME ROD
SPARK ELECTRODE
BURNER CONTROL VALVE
BURNER VALVE
PILOT/MAIN VALVE
IGNITION CONTROL
THERMAL SW
TEMP PROBE
SHIELDED CABLE
TEMP HI-LO LMT CKT BRD
TEMP CTRL
N.O. SWITCH HEAT
NO/NC SWITCH BLOWER
N.O. SWITCH CONVEYOR
BLOWER MOTORS
#1
#2
#3
#4
CONT C-1
CONT C-2
FANS
THERMAL SW(SPDT)
TERMINAL BLOCK
TIME DISPLAY MD10P
130VDC MOTOR
GND

FIGURE 10

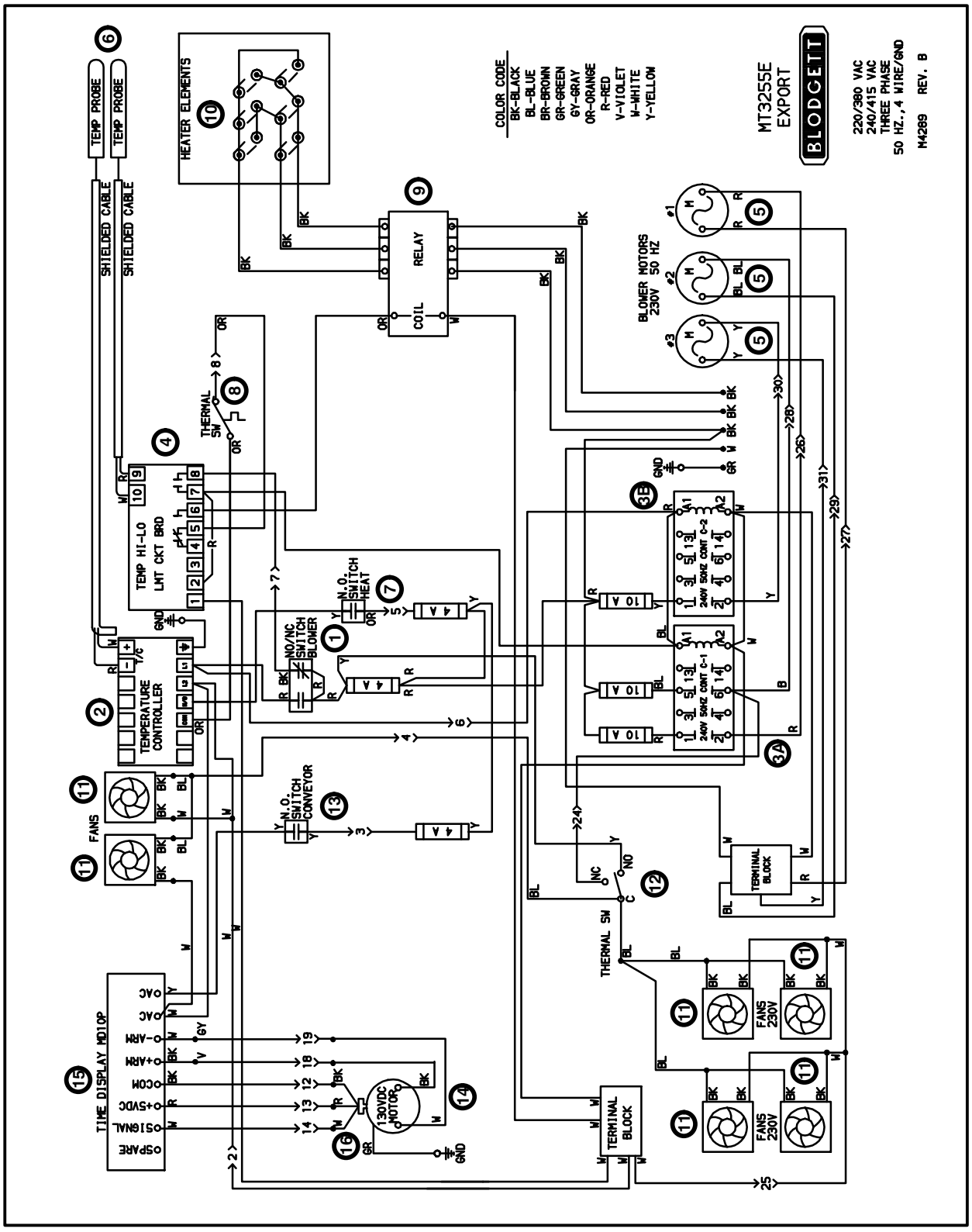

BLODGETT
MT3255E
EXPORT
220/380 VAC
240/415 VAC
THREE PHASE
50 HZ.,4 WIRE/GND
M4289 REV. B
COLOR CODE
BK-BLACK
BL-BLUE
BR-BROWN
GR-GREEN
GY-GRAY
OR-ORANGE
R-RED
V-VIOLET
W-WHITE
Y-YELLOW
TEMP PROBE
TEMP PROBE
SHIELDED CABLE
SHIELDED CABLE
HEATER ELEMENTS
RELAY
COIL
BLOWER MOTORS 50 HZ
TEMP HI-LO LMT CKT BRD
THERMAL SW
TEMPERATURE CONTROLLER
N.O. SWITCH HEAT
NO/NC SWITCH BLOWER
N.O. SWITCH CONVEYOR
FANS
TERMINAL BLOCK
THERMAL SW
FANS 230V
TIME DISPLAY MD10P
130VDC MOTOR
GND

FIGURE 11

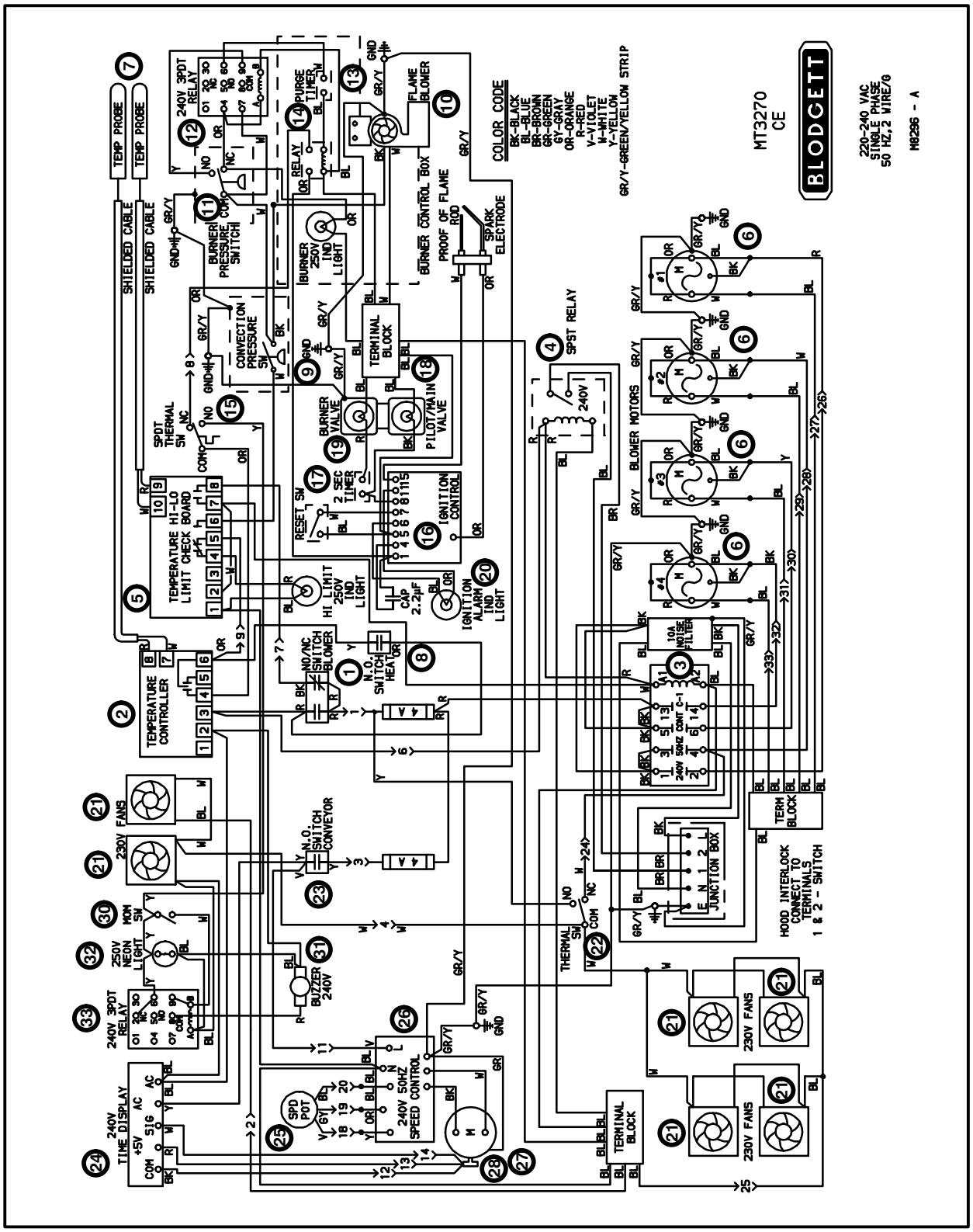

MT3270
CE
BLODGETT
220-240 VAC
SINGLE PHASE
50 HZ,2 WIRE/G
M8296 - A
COLOR CODE
BK-BLACK
BL-BLUE
BR-BROWN
GR-GREEN
GY-GRAY
OR-ORANGE
R-RED
V-VIOLET
W-WHITE
Y-YELLOW
GR/Y-GREEN/YELLOW STRIP
TEMP PROBE
SHIELDED CABLE
TEMPERATURE CONTROLLER
TEMPERATURE HI-LO LIMIT CHECK BOARD
240V 3PDT RELAY
PURGE TIMER
FLAME BLOWER
BURNER PRESSURE SWITCH
CONVECTION PRESSURE SW
BURNER 250V IND LIGHT
TERMINAL BLOCK
BURNER CONTROL BOX
PROOF OF FLAME ROD
SPARK ELECTRODE
SPDT THERMAL SW
RESET SW
2 SEC TIMER
IGNITION CONTROL
BURNER VALVE
PILOT/MAIN VALVE
HI LIMIT 250V IND LIGHT
CAP 2.2µF
IGNITION ALARM IND LIGHT
NO/NC SWITCH BLOWER
N.O. SWITCH HEATER
SPST RELAY
BLOWER MOTORS
10A NOISE FILTER
N.O. SWITCH CONVEYOR
FANS
230V FANS
MOM SW
250V NEON LIGHT
BUZZER 240V
240V 50HZ SPEED CONTROL
SPD POT
240V TIME DISPLAY
THERMAL SW
JUNCTION BOX
TERM BLOCK
HOOD INTERLOCK CONNECT TO TERMINALS 1 & 2 - SWITCH

FIGURE 12

OVEN ADJUSTMENTS FOR COOKING

TEMPERATURE

The internal temperature of your product is very important; and should be taken as soon as the product completely exits the cooking chamber. This reading will give a general indication of whether or not the product is fully cooked. A multiple topping pizza, for example, will be cooked if the internal temperature is over 160-165°F (64-67°C). For a single topping, such as cheese, the temperature should be greater than 170-180°F (69-74°C).

CONVEYOR SPEED TIME VS. TEMPERATURE

Typically, as the temperature increases, the time decreases. Conversely, as the temperature decreases, the time increases. To find a good bake time and temperature, one or the other should remain constant. For example, if the temperature is set at 480°F (224°C) and the belt speed is set at 7 minutes 30 seconds, but the pizza is not as brown as desired, keep the time setting the same and increase the temperature to 500°F (234°C).

AIR FLOW ADJUSTMENTS

Since a variety of products can be cooked in this oven, special settings for air flow must be made for your product. Unless otherwise specified, Blodgett Mastertherm® conveyor ovens are shipped from the factory with only partial air flow above the conveyor. This means that most of the air flow holes are "blocked-off" via steel strips which stop the heated air from reaching the item being cooked. These strips or "block-off plates" can be easily relocated to regulate the amount of air for your particular needs. The area below the belt has all air flow holes open.

1. Remove the End Plug from the side of the oven that needs adjusting.
2. Using the handle supplied with the oven, pull out the Air Flow Plate. On occasion, it may be necessary to "bang" the air plate from underneath to "pop" it from it's air seals.
3. Notice the Air Flow "Block-off" Plates. After the amount of air flow required has been determined, either remove or relocate the plate using the screws and wing nuts provided, (one strip covers one group of holes). Locate the Air Flow Plate into the track, sliding it back into the oven. Replace the End Plug.

Here are some suggestions for setting up the air flow. Keep in mind that the first half of the oven is used for the initial baking of the product and the last half is used for browning. We will use pizza as an example.

EXAMPLE:

A good bake time and temperature have been established, but more browning on top of the pie is desired. Relocate one of the "block-off plates" above the belt to open a few rows of holes toward the exit end of the oven. This will allow more of the superheated air to brown the top just prior to exiting the oven.

EXAMPLE:

The bottom of the pie is golden brown, but the top is a little too dark. Closing off some of the air flow from the top at the exit end of the oven will cure this problem. Leave the time and temperature at the same settings.

EXAMPLE:

The top of the pie is too dark, but either the bottom is not done enough, the center of the pie is doughy, or the ingredients are not fully cooked. Open some of the rows of holes above the conveyor at the entry half of the oven and close off the holes at the exit. This will allow the superheated air to penetrate the pie from the top and bottom (at the beginning of the cooking cycle) quicker. As a result the center of the crust and/or ingredients will be cooked before the pie starts the browning stage. Leave the time and temperature at the same settings.

WARNING!!

In the event of a power failure, all switches should be turned off, and no attempt should be made to operate the appliance until power is restored.

In the event of a shut—down of any kind, allow a five (5) minute shut off period before attempting to restart the oven.

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CHAPTER 4

CALIBRATION AND ADJUSTMENT

CONVECTION BLOWER MOTORS

TO CHECK MOTOR ROTATION

1. Remove the back of the oven body and verify proper motor rotation. (See FIGURE 1)

For motor placement, the direction of rotation is viewed left to right from the oven's rear. Typically the motor direction is referenced to the end of the shaft (EOS). However due to the vertical positioning of the motors in Mastertherm ovens, it is more instructive to reference the end of the motor (EOM) as looking from the rear of the oven. In FIGURE 1 all directions are taken from EOM. The correct rotation amperage draw is approximately 1 amp. If the measured amperage is less than .5, check for proper motor rotation direction.

TO CHECK LOW-LIMIT

1. Turn the oven on and let it heat up to approximately 200°F (93°C).
2. Shut the oven off. The blowers should come back on in several seconds.
3. When the blowers shut off, turn the oven on.

   If computer controlled press the "ACT TEMP" key to verify that the blowers shut off between 135°F (57°C) and 170°F (77°C). If the blowers do not shut off refer to the Troubleshooting section page 5–3.

   For standard controls, turn the blower switch to on to record the temperature. Adjust the hi/lo board if necessary. See page 4–6 for temperature calibration procedure.

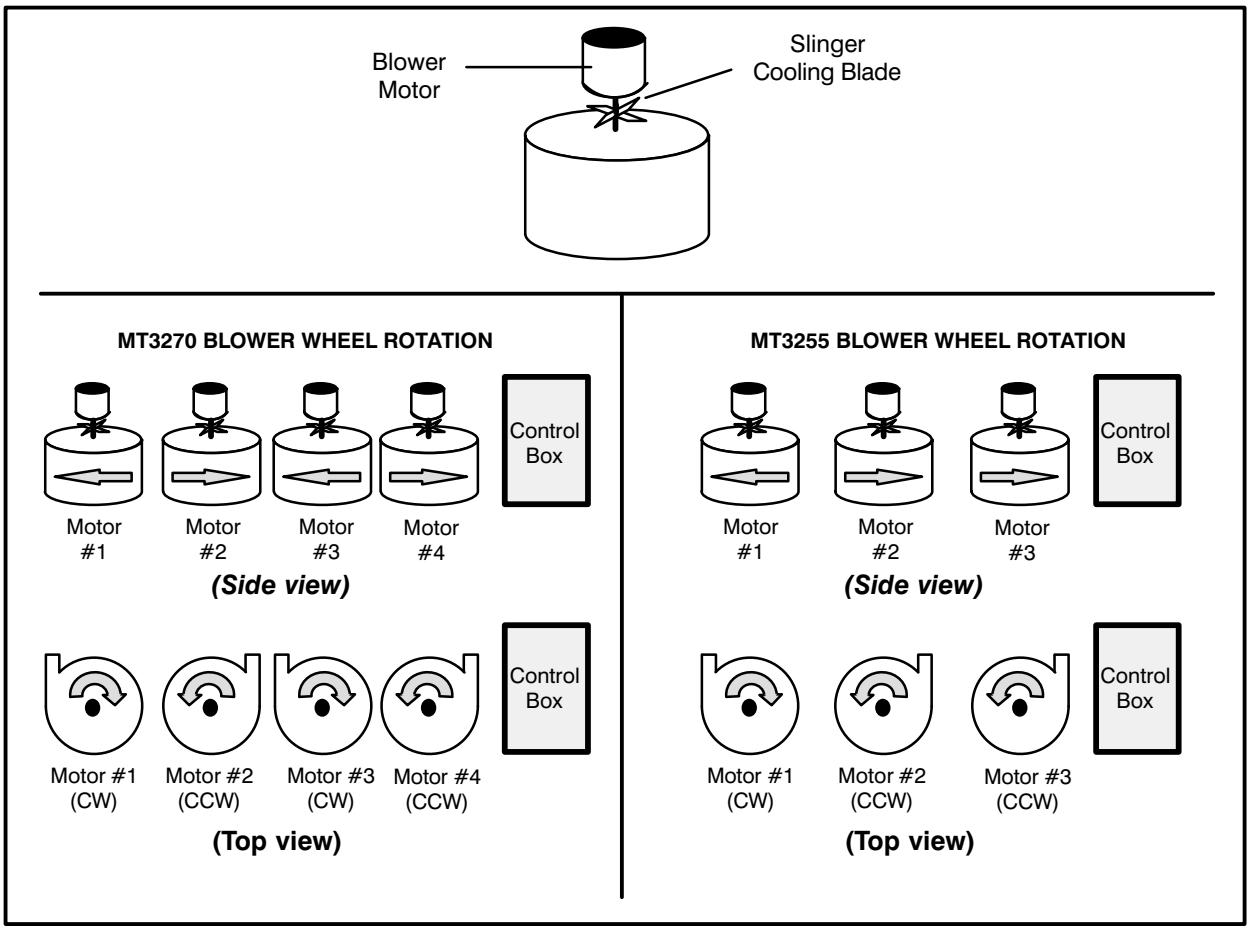


FIGURE 1

REGULATED GAS PRESSURE

1. Let the oven run up to 510°F (266°C). You may now verify the operational and regulated gas pressures.

Incoming static gas pressure to the unit, with all the gas appliances drawing from the supply, should be a minimum of 5.5" W.C. (13.7 mbar) for natural gas and 11" W.C. (28 mbar) for propane gas. The manifold pressure, if measured after the regulator located inside the control box, must be 3.5" W.C. (9 mbar) for natural gas and 10" W.C. (25 mbar) for propane gas. For CE pressures reference TABLE 2 on page 1—3 of the Introduction.

The pressure can be checked at the tap on the dual regulated gas valve or at the tap on the tee valve.

If pressure adjustments are needed, turn the adjusting screw located under a screw cap of the dual regulated valve. Adjust the gas pressure by turning the screw clockwise to raise the gas pressure and counter-clockwise to lower the gas pressure. Be sure to reinstall the screw cap; should the diaphragm rupture this cap acts as a flow limiter

The air shutter disc on the burner blower motor, located inside the control box at the top of the assembly, is factory adjusted to provide the most efficient blue flame possible at sea level. Visually examine the flame to verify it's quality. Should it need adjustment, increase or decrease the air mixture to attain the best flame quality.

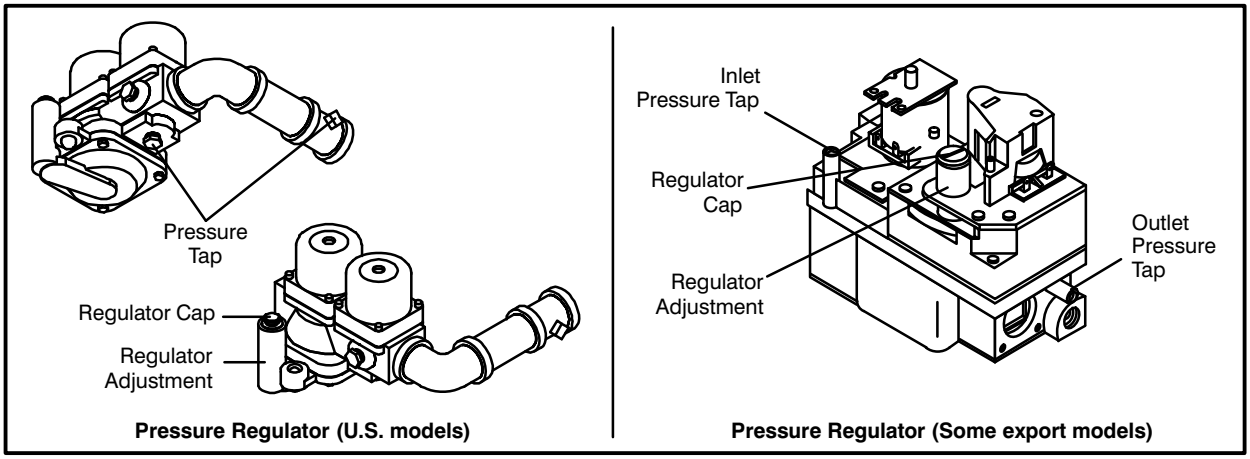


FIGURE 2

Setting Equipment for Other Types of Gas — CE Models

1. Shut off the gas valve and turn off the operating switch.
2. Dismantle the gas block by means of couplings.
3. Dismantle the main burner and replace the injector.
4. Replace pilot injector.
5. Install the burner and gas block.
6. Check for leakage and possible loose electrical connections.
7. Adjust gas pressure if necessary, See FIGURE 3.

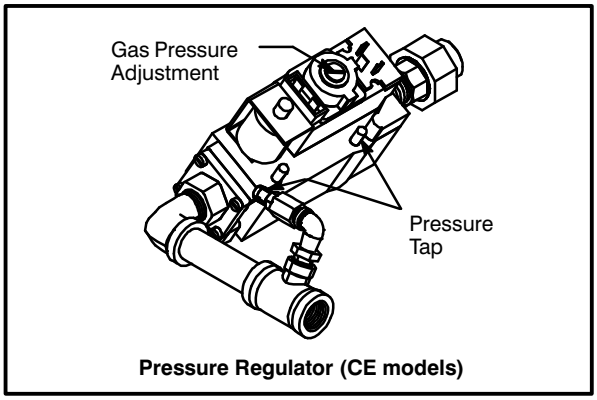


FIGURE 3

STANDARD CONTROLLER CONFIGURATION

BELT SPEED CALIBRATION – CLOSED LOOP

DART MICRODRIVE MDP

1. Remove the top cover from the unit. The internal dip switch is located next to the transformer. See FIGURE 4.

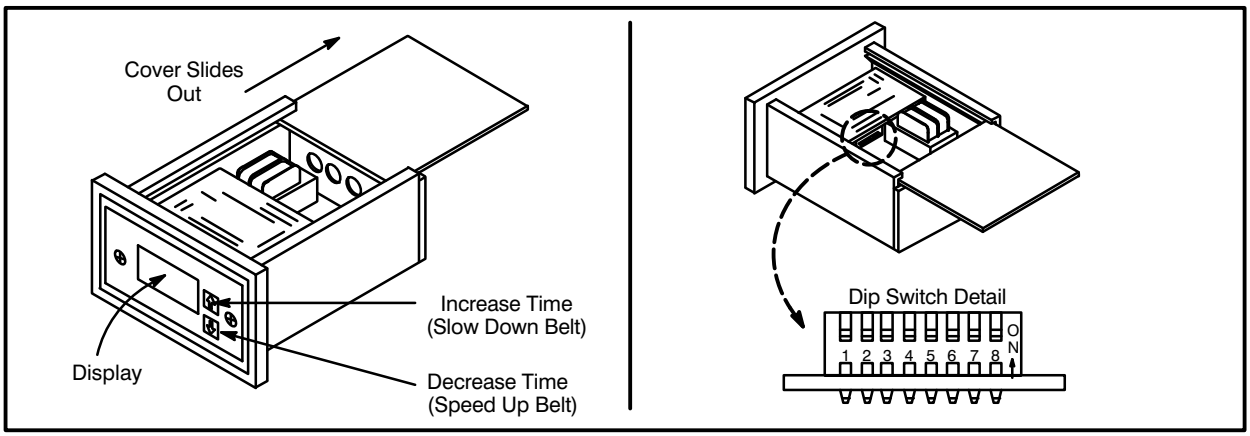


FIGURE 4

DIP SWITCH FUNCTION TABLE		
Switch 1	Program Constant	
Switch 2	Program Minimum Setting	
Switch 3	Program Maximum Setting	
Switch 4	Rate/Time Mode and Decimal Decimal Point Select	0 thru 4 = Rate/Follower Decimal 5 = Time Mode/Colon
Switch 5	Master/Follower Select	OFF=Master ON=Follower
Switch 6	DO NOT USE – SET TO OFF	
Switch 7	Program/Run Select	OFF=Run ON=Program
Switch 8	DO NOT USE – SET TO OFF	

TABLE 1

FIELD PROGRAMMING MDP CONTROLS

While in Programming Modes, set decimal place/mode variable to the proper position (0 thru 4 = Rate 5 = Time). This allows settings to be made in the proper units. Only set the variables that you wish to change. You can change any variable WITHOUT having to reset the others.

SETTING UP CUSTOM VALUES

To Enter Programming Mode (Motor Will Stop)

1. Make sure DIP switches 1, 2, 3, 4, 5, 6 and 8 are OFF. Flip DIP switch 7 ON.
2. Display reads *PROG* (in rate mode the current decimal point is also displayed.
3. Use the following instructions to view and/or edit any variable.

Displayed Decimal Place, Rate or Time Mode Select

1. Flip DIP switch 4 (Rate—Time Mode/Program Decimal Place) to ON.
2. Present decimal point (if any) will be lit, as well as the current value of the decimal place variable.
3. Use Up and Down buttons to change. Use a value of 5 for Time Mode.
4. When finished, flip DIP switch 4 to OFF.
5. The display reads *PROG.*

The Constant

1. Calculate the constant for your application. For ovens with a 70 inch tunnel, 130 Volt DC or 90 VDC motor and #2 pick-up, the constant is 5:20. For ovens with a 55 inch tunnel, 130 Volt DC or 90 VDC motor and #2 pick-up, the constant is 4:08.
2. Flip DIP switch 1 (Program Constant) ON.
3. Present value for constant will appear in the display.
4. Use Up and Down buttons to change.
5. When finished, flip DIP switch 1 OFF.
6. The display reads *PROG*.

NOTE: If you change the constant, the display setting will be set to the slowest speed when you exit the Programming Mode.

Program Minimum Setting

1. Flip DIP switch 2 (Program Minimum Setting) ON.
2. Present value for Lower Limit will appear in the display.
3. Use Up and Down buttons to change.
4. When finished flip DIP switch 2 OFF.
5. The display reads *PROG*.

Program Maximum Setting

1. Flip DIP switch 3 (Program Maximum Setting) ON.
2. Present value for Upper Limit will appear in the display.
3. Use Up and Down buttons to change.
4. When finished flip DIP switch 3 OFF.
5. The display reads *PROG*.

To Exit Programming Mode

1. Make sure DIP switch 5 (Master/Follower Mode select) is in the desired position (ON = Follower; OFF= Master).

   NOTE: In most cases DIP switch 5 should be set to the master position (OFF).

2. Make sure DIP switches 1, 2, 3, 4, 6 and 8 are OFF.
3. If satisfied with programming values, set DIP switch 7 to OFF.
4. The control begins to operate, using the values and modes you have programmed.

Check the Belt Speed Calibration

To check the belt speed calibration place a pan on the belt and start the conveyor.

1. Begin timing the belt's speed when the trailing edge of the pan enters the oven.
2. End the timing cycle when the trailing edge of the pan exits the oven.
3. If the displayed time differs from the actual more than 5 seconds, reprogram the "K" constant. If the measured time is lower than 5 seconds, raise the "K" constant in increments of 05. If the measured time is higher than 5 seconds, lower the "K" constant in increments of 05.

BELT SPEED CALIBRATION — OPEN LOOP

NOTE: The following procedures must be performed after dc voltage levels have been set and are known to be accurate.

The cooking time digital display should be adjusted when changing any of the system components. Prior to adjusting the display, determine the following two specifications:

1. **The number of pulses per spindle revolution generated by the Hall effect pickup.**

   Move the plastic end-caps on the pickup located on the DC motor. If the pickup is marked with the number 2, it is a single pulse per revolution pickup. If the pickup is marked with the number 10 (Standard After 6-1-91) it is a five pulse per revolution pickup. Replace the end-caps. Refer to page 5—1 for pickup troubleshooting.

2. **The manufacturer and the voltage rating of the DC drive motor.**

   This information is embossed on the nameplate located on the motor's case.

Once the above specifications have been determined, perform the following calibration procedures.

1. Remove the screws securing the cooking time display lens cover. Remove the lens cover. If a 5 pulse pickup is used, verify that the multiplier potentiometer is set to the x10 position (refer to FIGURE 5 for the potentiometer location).

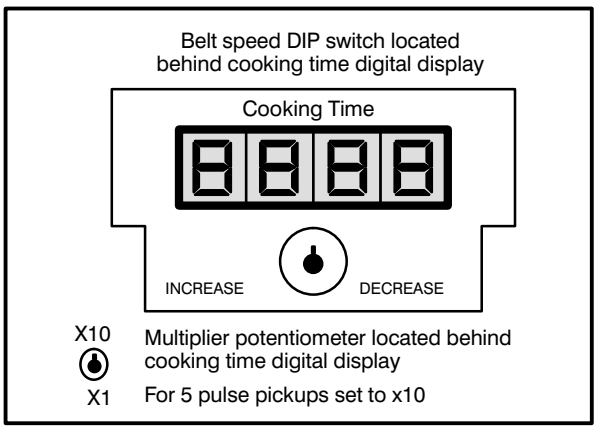


FIGURE 5

Set The Belt Speed DIP Switches.

Set the DIP switches using the data from the table below.

Pickup	DIP Switch Setting
MT3255 — 60 Hz Motors	
Single	7, 6, 5, 4, 3 ,2 , 1 — set to OFF
5 Pulse	7 — set to OFF
MT3270 — 60 Hz Motors	
Single	8, 6, 2 — set to OFF
5 Pulse	7, 5, 1 — set to OFF
MT3255 — 50 Hz Motors	
Single	8, 5, 3, 2 — set to OFF
5 Pulse	7, 4, 2, 1 — set to OFF
MT3270 — 50 Hz Motors	
Single	8, 6, 5, 4, 3, 2, 1 — set to OFF
5 Pulse	7, 5, 4, 3, 2, 1 — set to OFF

TABLE 2

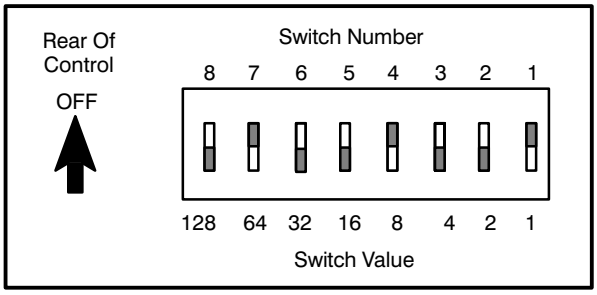


FIGURE 6

TEMPERATURE CALIBRATION — UNITED ELECTRIC CONTROLLER

NOTE: Th U.E. and Zytron boards get input from either single or dual lead thermocouples.

LOW LIMIT ADJUSTMENT

1. Bring the oven to 200°F (93°C).
2. Turn both the blower and the heat switches to OFF. The blower should continue to run.
3. Monitor the digital temperature control display. The blower motors should shut off within the range of 170-135°F(77-57°C).
4. To adjust the temperature, turn the low-limit potentiometer. A clockwise rotation increases the setting, counter-clockwise decreases it. See FIGURE 7.

TEMPERATURE CALIBRATION

1. With the conveyor turned off, place a pyrometer in the center of the oven cavity.
2. Adjust the set point for 500°F (260°C). Monitor the Indicator Lamp. See FIGURE 7. When the lamp goes out, compare the pyrometer with the temperature of the display. If the display differs by +/-5°F (3°C), open the access panel on the temperature controller and continue with STEPS 3 and 4.
3. Adjust the Meter High Set so the display matches the pyrometer. A clockwise rotation lowers the display reading and raises the temperature. A counter-clockwise rotation raises the reading and decreases the temperature. Check the oven set point. Adjustment of the potentiometer may affect this reading. Bring the oven up to 525°F (274°C). Verify the calibration.
4. Set Point Adjustment - Adjust the Coarse Manual so the controller calls for heat at 522°F (272°C) and shut-offs at 525°F (274°C). A clockwise rotation raises the temperature, counter-clockwise lowers it.

HIGH LIMIT ADJUSTMENT

1. Turn both the blower and the heat switches to ON.
2. Set the temperature to 620°F (327°C). When the display reads 600°F (316°C), the burner blower motor should shut off. If the temperature rises above 600°F (316°C), adjust the hi-limit pot (See FIGURE 7) so the burner shuts off at 600°F (316°C). A clockwise rotation of the high-limit pot increases the temperature, counter-clockwise decreases it.

NOTE: Repeat Low Limit Adjustment STEPS 1-3 to verify new settings.

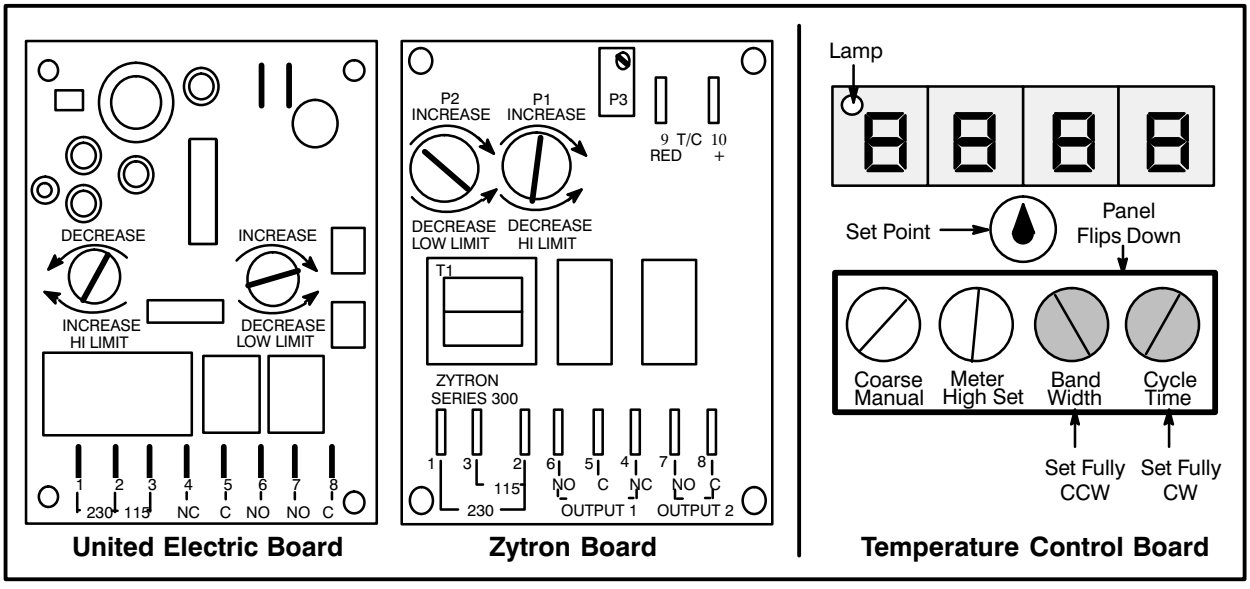


FIGURE 7

TEMPERATURE CALIBRATION — ATHENA CONTROLLER

THE CONFIGURATION MENUS

1. Press and hold the actual temperature key for approximately 10 seconds. When the menu system has been accessed, the display toggles between dEF and either SP or Act.

Setting the Default Display

The default display determines whether the controller displays the actual or the setpoint temperature.

1. Use the arrow keys to select the desired display default.

   NOTE: We recommend using the setpoint display default.

2. Press the actual temperature key to enter the selected display default. The display will toggle between HYS and a numerical value.

Setting the Control Hysteresis

The control hysteresis, or the burner cycle is used to prevent rapid cycling around the setpoint. The hysteresis is adjustable from 2°F to 252°F (0°C to 140°C).

1. Use the arrow keys to select the desired control hysteresis.

   NOTE: We recommend using the 5°F initially.

2. Press the actual temperature key to enter the selected hysteresis value. The display will toggle between OFF and a numerical value.

Setting the Display Offset

The display offset is used to provide a limited adjustment of the displayed temperature as a compensation for offsets between the actual temperature and the temperature seen by the thermocouple. The display offset is adjustable from -126°F to +126°F (-70°C to 70°C).

1. Use the arrow keys to select the desired display offset.
2. Press the actual temperature key to enter the selected offset value. The display will toggle between ALr and a numerical value.

Setting the Deviation Band Alarm

The deviation band alarm causes the display to flash when the actual temperature varies (in either direction) from the setpoint. The deviation band alarm is adjustable to off or values from 1°F to 252°F (1°C to 740°C).

1. Use the arrow keys to select the desired deviation band alarm.
2. Press the actual temperature key to enter the selected alarm value.

To exit the Configuration Menus

1. Push and hold the actual temperature key for approximately 3 seconds.

NOTE: The unit exits the configuration menus if the controller is not touched for 1 minute at any time during the programming process.

SETTING THE DISPLAY UNITS

1. Disconnect the power from the control. Remove all wires and the back of the control.
2. Locate the black jumper on the microcontroller board next to the thermocouple connection. Install the jumper on both pins.
3. Reconnect the power to the control.
4. Press and hold the actual temperature key for approximately 10 seconds until the display reads unt and flashes F or C. Press the up or down arrow key to toggle between °F and °C.
5. Press and hold the actual temperature key until the control exits the programming mode.

NOTE: DO NOT disconnect power and move the jumper back to single pin until the control has returned to normal operation.

LOW LIMIT ADJUSTMENT

1. Bring the oven to 200°F (93°C).
2. Turn both the blower and the heat switches to OFF. The blower should continue to run.
3. Monitor the digital temperature control display. The blower motors should shut off within the range of 170-135°F(77-57°C).
4. To adjust the temperature, turn the low-limit potentiometer. A clockwise rotation increases

the setting, counter-clockwise decreases it. See FIGURE 8.

HIGH LIMIT ADJUSTMENT

NOTE: Refer to the wiring diagram located on the oven or on page 3–21 of the Operation section. For additional assistance call the Blodgett Service department.

1. Remove the wires from the common and N.O. terminals. Touch the wires together to energize the heat circuit. This enables the oven to heat above the highest temperature allowed by the controller.
2. When the display reads 600°F (316°C), the burner blower motor should shut off. If the temperature rises above 600°F (316°C), adjust the hi-limit pot (FIGURE 8) so the burner shuts off at 600°F (316°C). A clockwise rotation of the high-limit pot increases the temperature, counter-clockwise decreases it.

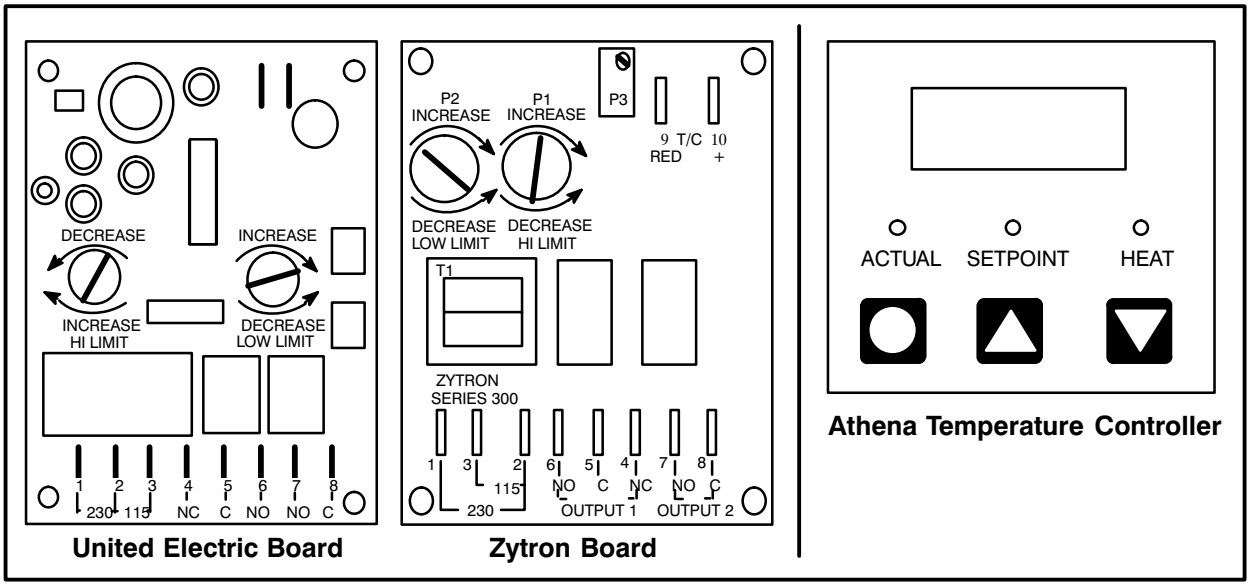


FIGURE 8

COMPUTER CONTROLLER CONFIGURATION

COMPUTER CONTROLS

INITIATING ACCESS MODE

The Cooking Computer provides a special Access Mode for setting and displaying certain computer special functions. To initiate the Access Mode place the control in the OFF state, (OFF is shown in the display when power is first applied to the control). Press the following sequence of keys to set the control to Access Mode: CLEAR 1 2 3 4 5 6 ENTER. The display reads *ACCESS*.

CONFIGURATION

When the controller is in the "ACCESS" mode, press the following buttons: CLEAR 1 1 1 ENTER. With the exception of the positive and negative offsets, to be addressed later, all display data should correspond to the entries in the chart below. If the data does not match the chart, it should be changed accordingly. When the correct data is displayed press the PROG/ENTER key, the display will cycle on to the next screen. If a step is missed, press the CLEAR button to backup.

DISPLAY	ACTION TAKEN	DISPLAY	ACTION TAKEN
F/CMODE?	Press PROG ENTER	T ➧ F°(°C)	Press PROG ENTER again or hit any number and it will change.
POS OFFSET?	Press PROG ENTER	0°(0°)	Press PROG ENTER
NEG OFFSET?	Press PROG ENTER	0°(0°)	Press PROG ENTER
MAX-T ENTRY?	Press PROG ENTER	600°(315°)	Press PROG ENTER or change then press again.
MAX-T LIMIT?	Press PROG ENTER	625°(330°)	Press PROG ENTER
READY BAND?	Press PROG ENTER	10	Press PROG ENTER
MIN-HT ON?	Press PROG ENTER	60	Press PROG ENTER
DISPLAY INTEG?	Press PROG ENTER	30	Press PROG ENTER
T-CTRL INTEG?	Press PROG ENTER	10	Press PROG ENTER

TABLE 3

NOTE: Press the CLEAR key to back up one parameter.

Boost Option — (versions 2.00 or 3.00)

When the controller is in the "ACCESS" mode, press the following buttons: CLEAR 2 1 2 ENTER to enter the boost option.

DISPLAY	ACTION TAKEN	DISPLAY	ACTION TAKEN
BOOST / MODE-? (Flash alternately)	Press PROG ENTER	OPT-1 or OPT-2	Press any numeric key to toggle between OPT-1 and OPT-2
Select OPT-1 to turn off boost mode.			
OPT-1	Press PROG ENTER	DONE SAVE EXIT	Press PROG ENTER

TABLE 4

EXITING THE ACCESS MODE

After pressing PROG/ENTER the last time, the display will show "EXIT" then beep and return to the "ACCESS" mode. Pressing and holding the ON/OFF key will turn the oven on. A new time and temperature must be entered upon exiting the "ACCESS" mode since the oven will automatically default to 0. The oven will not fire until both time and temperature are entered.

Firmware Model Version Display

Password: CLEAR 1 2 3 ENTER

MODEL - Computer Model Number — 6028 (Blodgett Conveyor Oven With Speed Control)

SW-VER - Firmware version number. V-xxyy xx = major version, yy = minor version

DATE-? -Firmware release date

CHKSUM - ROM checksum stored in PROM. xxxx - Value is display in hexadecimal format.

TEMPERATURE CALIBRATION

TO ENTER THE CALIBRATION MODE

1. Press the ON/OFF key until *OFF* is displayed.
2. Press CLEAR 1 2 3 4 5 6 ENTER to enter the access mode**.** The display reads *ACCESS*.
3. Press CLEAR ACT_TEMP ACT_TEMP ACT_TEMP ENTER to access the Temperature Calibration mode**.**
4. Disconnect the white wire from the D.C. motor. Secure so the wire will not ground against any part of the oven. This will disable the conveyor.

NOTE: Disregard the controller display. The only numbers of concern are the pyrometer reading and the temperature set point.

TO CALIBRATE THE OVEN TEMPERATURE

During operation, the temperature control is based on the measured temperature and the temperature offset which is programmed into the control. If the temperature measured in the center of the oven is below the oven setpoint a positive offset is needed. If the temperature measured in the center of the oven is above the oven setpoint a negative offset is needed.

NOTE: In the calibration mode the display gives the current measured temperature only.

To view the current temperature setpoint:

1. Press the SET_TEMP, key.

To change the temperature setpoint :

1. Press PROG/ENTER SET_TEMP.
2. Enter the desired setpoint.
3. Press the PROG/ENTER key.

To program the temperature offset:

To change the temperature calibration an offset, positive or negative, must be programmed.

1. Press PROG/ENTER followed by ACT_TEMP. The display flashes either *POS * OFFSET* or *NEG * OFFSET*

   NOTE: POS OFFSET is displayed if a value has been programmed in for a positive offset. NEG OFFSET is displayed if a value has been programmed for a negative offset. The only time both will be displayed is if a value of 0 has been entered for both.

2. Enter a value for the desired offset. The display flashes *DISPLAY * INTEG?.*
3. Press the PROG/ENTER key. The default value of 30 will be displayed.
4. Press the PROG/ENTER key. The display will flash *T-CTRL * INTEG?.*
5. Press the PROG/ENTER key. The default value of 10 will be displayed.
6. Press the PROG/ENTER key.

The control will now resume using the new parameters.

Verify the temperature calibration once the unit has cycled for 5 minutes with the new settings. Repeat calibration using a new offset value if necessary.

TO EXIT THE CALIBRATION MODE

1. Press the CLEAR key twice.
2. The display flashes *REBOOT* then displays the set time and temperature. You must re-enter a temperature for the oven to start heating again.

   A.) Press PROG/ENTER SET_TEMP

   B.) Enter the desired temperature.

   C.) Press the PROG/ENTER key. The heat light turns on and the burner begins to cycle at set point.

BELT SPEED CALIBRATION

To enter the calibration mode:

1. Press the ON/OFF key until *OFF* is displayed.
2. Press CLEAR FRONT BELT, FRONT BELT, FRONT BELT, PROG/ENTER to enter the Access mode. The display flashes *ACCESS*.
3. The display reads *ACTIVE BELT—?*. Press front belt for Front Belt Calibration
4. The display reads *FRONT—INIT—F*.

Belt speed calibration:

1. The display reads *BELT SIZE—?.* Enter the length of the conveyor belt for your model. See TABLE 5. Press the PROG/ENTER key.
2. The display reads *STEP—1.* The controller is in Step 1 of the calibration procedure: maximum belt speed. The motor control is automatically set to its maximum output. Place an object on the belt and note the time from entrance to exit.

   NOTE: Be certain to measure either the leading edge in and out or the trailing edge in and out. Do not use the leading edge in and the trailing edge out.

   A.) The display reads *STEP—1TIME—?.* Enter the time measured in STEP—1. Min: 0 Max: 59:59 (min:sec). Press the PROG/ENTER key.

   B.) The display reads *STEP—1DIST—?.* Enter the belt length for your model. See NO TAG. Press the PROG/ENTER key.
3. The display reads *STEP—2.* The controller is in Step 2 of the calibration procedure: minimum belt speed. The motor control is automatically set to its minimum output. The belt will travel very slowly during this part of the calibration procedure. To minimize the time spent on STEP—2, measure off 10” on the conveyor support. Place an object on the belt and note the travel time for the 10” measured distance.

   A.) The display reads *STEP—2 TIME—?.* Enter the measured travel time for STEP—2. Min: 0 Max: 59:59 (min:sec). Press the PROG/ENTER key.

   B.) The display reads *STEP—2 DIST—?.* Enter 10”. Press the PROG/ENTER key.
4. The display reads *MIN—TM ENTRY?* (the fastest belt speed). Limits of this value are determined by the Step—1 and Step—2 calibration values. See TABLE 5 for correct entry for this model. Press the PROG/ENTER key.
5. The display reads *MAX—TM ENTRY? (*slowest belt speed). Limits of this value are determined by the Step 1 and Step 2 calibration values. Use 1600 (16 min). Press the PROG/ENTER key.
6. The display flashes *DONE* and *SAVE.*

Repeat the procedure for the rear belt by pressing, CLEAR, REAR BELT, REAR BELT, REAR BELT, PROG/ENTER**.**

NOTE: During these adjustments, pressing the clear button will abort all entries and require reprogramming of belt time mode. When exiting the Belt Speed Calibration Mode, enter a time. Otherwise the time defaults to zero and the oven will not heat, and the belt will not move.

Oven Type	Belt Length/ Distance	Minimum Oven Entry	Oven Type	Belt Length/ Distance	Minimum Oven Entry
MT1828	28	330 (3 min, 30 sec)	MT3270	70	330 (3 min, 30 sec)
MT2136	36	200 (2 min)	MT3855	55	330 (3 min, 30 sec)
MT3240	40	300 (3 min, 00 sec)	MT3870	70	330 (3 min, 30 sec)
MT3255	55	300 (3 min, 00 sec)			

TABLE 5

MOTOR CONTROL BOARD ADJUSTMENT

NOTE: This procedure does not apply to Dart Microdrive systems.

High/low speed motor control board adjustment for 180 and 130 volt DC motors

NOTE: The motor control board is located on the slide out control panel.

High Speed Motor Adjustment:

Follow Belt Speed Calibration through STEP 2 (see page 4−12).

1. With the motor connected (make no open circuit voltage readings) measure the voltage at the motor leads (A1 & A2 in FIGURE 9) on the DC control board. If the voltage is not within 3 VDC of the specified voltage continue with step 3.
2. Turn the MAX trim pot counter-clockwise to lower and clockwise to raise the voltage until it is within 3VDC of the specified voltage.

   NOTE: For computerized closed loop systems this adjustment must be made quickly.

Low Speed Motor Adjustment:

Continue Belt Speed Calibration through STEP 3 (see page 4−12).

1. With the motor connected (make no open circuit voltage readings) measure the voltage at the motor leads on the DC control board (A1 & A2 in FIGURE 9). If the voltage is not 26VDC +/- 1 VDC, continue with step 3.
2. Turn the MIN SPEED pot clockwise to lower the voltage and counter-clockwise to raise the voltage.

NOTE: If any voltage adjustments were made hit the CLEAR key to abort the calibration mode. Reenter the calibration mode to verify that voltage is locked in.

COMPUTERIZED OVENS				
	130 Volt System		**180 Volt System**	
Model	Low	High	Low	High
MT1828	20	130	26	180
MT2136	20	130	26	180
MT3240	20	130	26	180
MT3270	26	130	26	180
MT3855	26	130	26	180
MT3870	26	130	26	130
NON-COMPUTERIZED OVENS				
MT2136	20	130	26	180
MT3255	26	130	26	180
MT3270	26	130	26	180
MG3270	26	130		
24 VDC SYSTEM				
MT1820	3.0	21		

TABLE 6

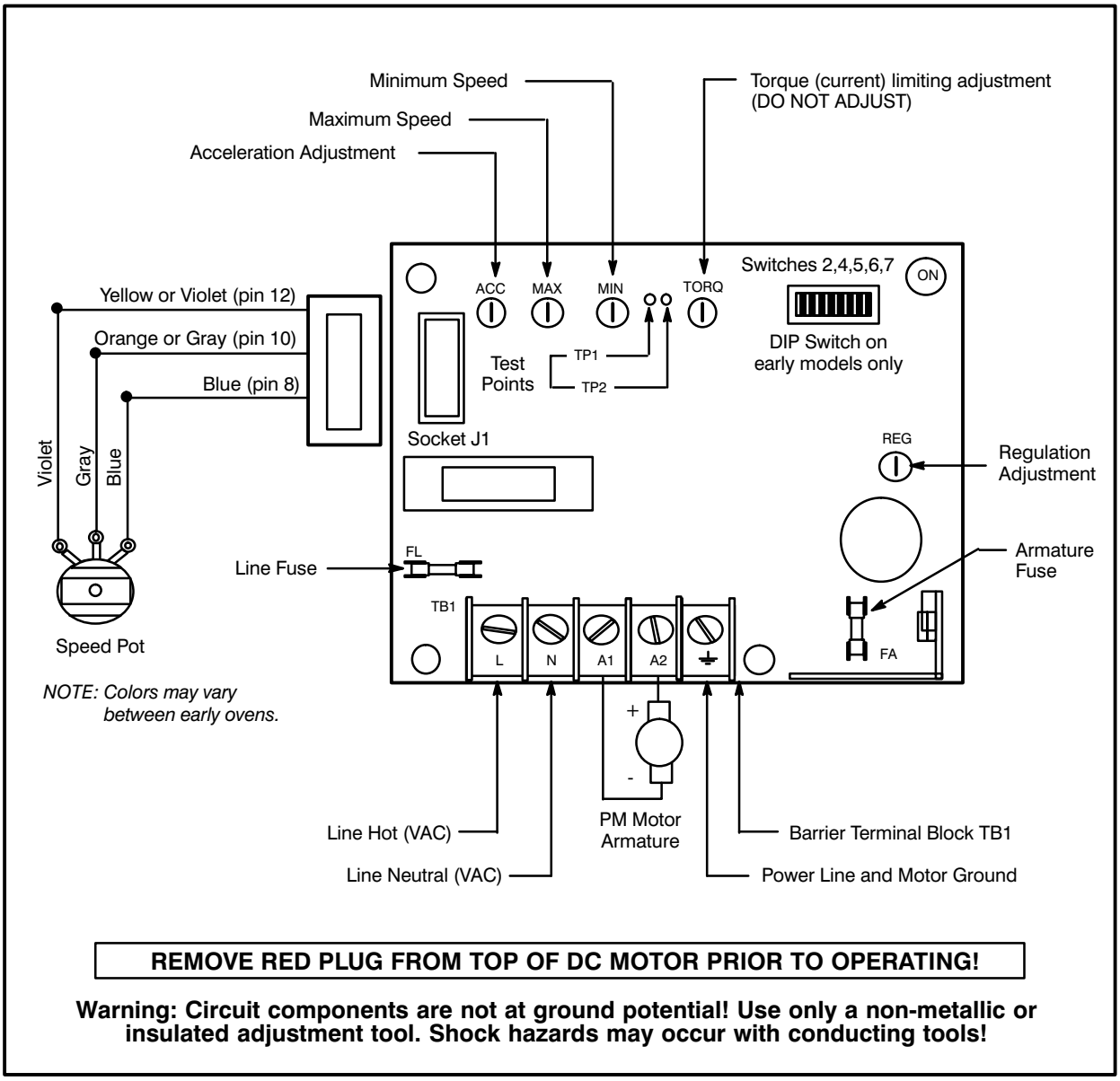

Minimum Speed
Maximum Speed
Acceleration Adjustment
Torque (current) limiting adjustment
(DO NOT ADJUST)
Switches 2,4,5,6,7
ON
ACC
MAX
MIN
TORQ
DIP Switch on
early models only
Test
Points
TP1
TP2
Yellow or Violet (pin 12)
Orange or Gray (pin 10)
Blue (pin 8)
Violet
Gray
Blue
Socket J1
REG
Regulation
Adjustment
Armature
Fuse
Line Fuse
FL
TB1
L
N
A1
A2
FA
Speed Pot
NOTE: Colors may vary
between early ovens.
+
-
PM Motor
Armature
Line Hot (VAC)
Line Neutral (VAC)
Barrier Terminal Block TB1
Power Line and Motor Ground
REMOVE RED PLUG FROM TOP OF DC MOTOR PRIOR TO OPERATING!
Warning: Circuit components are not at ground potential! Use only a non-metallic or
insulated adjustment tool. Shock hazards may occur with conducting tools!

FIGURE 9

RERATING THE APPLIANCE

Due to the lack of oxygen at higher elevations, the unit may need to be rerated. (The orifice size may need to be adjusted to accommodate different air pressures at higher elevations.) If not rerated, incomplete combustion may occur releasing Aldehydes and CO or Carbon Monoxide. **Any of these are unacceptable and may be hazardous to the health of the operator.**

To choose the correct orifice for different altitudes several factors must be known:

1. Altitude
2. BTUs per burner
3. Manifold pressure
4. Correct orifice size at sea level
5. BTU value of the gas

   The following are generally accepted heating values:

   A.) Natural Gas — 1000 BTU/Cu Ft

   B.) Propane — 2550 BTU/Cu Ft

   C.) Butane — 3000 BTU/Cu Ft

6. Specific gravity

   The following are generally accepted values (Air = 1.0):

   A.) Natural Gas — 0.63

   B.) Propane — 1.50

   C.) Butane — 2.00

NOTE: For other gases contact your local gas supplier for values.

Use the following formulas to calculate the correct orifice:

1. $\frac{\text{Firing rate}}{\text{\# of burners}} = \text{BTU per burner}$
2. $\frac{\text{BTU per burner}}{\text{Heating value of Gas}} = \text{CuFt/hr}$
3. $\frac{\text{CuFt/Hr}}{\text{Specific Gravity Multiplier}} = \text{Equiv. CuFt/hr}$
4. Use TABLE F-1 from the National Fuel Gas Code Handbook to determine the proper orifice size at sea level.

   NOTE: The sea level orifice size is needed to determine the proper orifice at any elevation.

5. Use TABLE F-4 from the National Fuel Gas Code Handbook to determine the correct orifice for the applicable elevation.
6. Use TABLE F-3 from the National Fuel Gas Code Handbook to determine the specific gravity multiplier.

EXAMPLE

Known factors:

1. Altitude = 5000 ft.
2. BTUs per appliance = 55,000
3. Number of burners = 2
4. BTU value of the gas = 900
5. Specific gravity = .50

Calculations:

1. $\frac{55{,}000}{2} = 27{,}500$ BTU per burner
2. $\frac{27{,}500}{900} = 30.55$ CuFt/hr
3. $\frac{30.55}{1.10} = 27.77$ Equiv. CuFt/hr

Using the tables in the National Fuel Gas Code Handbook we can determine that:

1. Correct orifice size at sea level = #40
2. Correct orifice size at 5000 ft = #42

CHECKING THE FIRING RATE

Method #1

1. Turn off all other appliances on the line. Turn on the appliance to be measured.
2. Using either the 1/2 cu. ft. or the 2 cu. ft. dials located on the gas meter, note the time it takes the indicator to complete one revolution. See FIGURE 10.
3. Use the following formula to determine the firing rate of the meter.

$$\frac{\text{3600 x size of test dial x 1000}}{\text{\# of seconds per revolution}} = \text{BTU/burner}$$

Example:

A.) 3600 x 2 = 7200

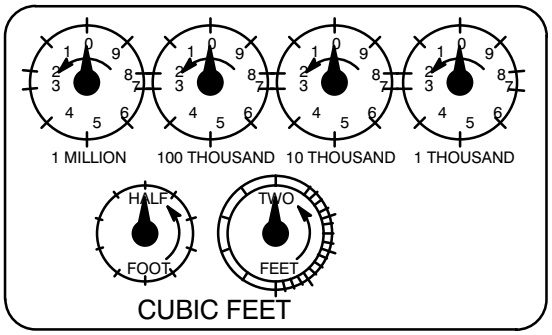
B.) $\frac{7200}{60}$ = 120 Cu. Ft./Hr

C.) To convert to BTU/Hr, multiply by one of the following generally accepted heating values:

Natural Gas — 1000 x 120 = 120,000 BTU
Propane — 2550 x 120 = 306,000 BTU
Butane — 3000 x 120 = 360,000 BTU

NOTE: You may also use TABLE XII from the National Fuel Gas Code Handbook to aid in determining the firing rate of the appliance. This table eliminates the use of the formulas above.

Locate the time observed in STEP 2. Move across the table to either the 1/2 cu. ft. or the 2 cu. ft. column to find the gas input to the burner.



TYPICAL DOMESTIC GAS METER INDEX

FIGURE 10

Method #2

You may also determine the firing rate by sizing the main burner orifice and measuring manifold gas pressure. Either way is accurate, however method #1 is faster.

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CHAPTER 5

TROUBLESHOOTING

DC DRIVE SYSTEM

POSSIBLE CAUSE(S)	SUGGESTED REMEDY
Symptom #1 – Belt does not move (standard controls)	
• Conveyor switch is turned off.	• Turn switch to on.
• Armature fuse on Bodine board is blown.	• Ohm this fuse out to determine if blown. If necessary, replace with 250 milliamp fuse. Determine the amp draw of the motor.
• Line fuse on Bodine board is blown.	• Replace with 5 amp fuse.
• DC motor is leaking oil.	• Replace motor.
• Motor ohms out higher then 162Ω.	• Replace motor.
• Motor ohms out lower then 100Ω.	• Replace motor.
• Brushes worn.	• Replace brushes.
• Control fuses blown.	• Check wiring going from the front control panel to the burner compartment for damage.
• Potentiometer does not ohm out correctly, 10kΩ.	• Replace potentiometer.
Symptom #2– Belt does not move (closed loop systems)	
• Conveyor switch is turned off.	• Turn switch to on.
• DC motor is leaking oil.	• Replace motor.
• Motor ohms out higher than 162Ω.	• Replace motor.
• Motor ohms out lower than 100Ω.	• Replace motor.
• Brushes worn.	• Replace brushes.
• Control fuses blown.	• Check wiring going from the front control panel to the burner compartment for damage.
• Dart microdrive not programmed.	• See page 4–4 for programming.
• Hall effect pickup defective.	• To check the pickup, run the belt as slow as possible. Connect the leads of the meter to the terminals with the black and red wires. The meter should read 5VDC. (The meter should have an anolog bar in it for the remainder of the test.) Connect the leads of the meter to the terminals with the white and red wires. The bar should pulse. Connect the leads to the white and black wires. The bar should pulse, if not replace pickup.

POSSIBLE CAUSE(S)	SUGGESTED REMEDY
Symptom #3 — Belt does not move (computer controls)	
• Oven in OFF mode.	• Turn to ON position.
• Loose computer controller cord connection.	• Adjust and retighten cables and set screws.
• Time not programmed into computer.	• Program in a cook time. See Operation Section (page 3—6).
• Emergency stop switch on OFF.	• Pull switch out to ON.
• Control circuit breaker tripped.	• Reset breaker.
• Belt hooked on something in oven.	• Turn oven OFF, unhook and repair problem.
• 5 amp line fuse blown.	• Replace fuse. Determine amp draw.
• 200 milliamp armature fuse blown.	• Replace fuse. Determine amp draw.
• Hall Effect Pickup not connected. *(Closed loop systems only)*	• Verify the unit is set for a single pulse pickup. If not, reset for a single pulse pickup. If yes reattach the pickup.
• Motor brushes worn out.	• Replace brushes.
• Defective conveyor drive motor.	• Replace conveyor drive motor.
• Defective conveyor drive motor controller.	• Replace conveyor drive motor controller.
• Wire from pickup open or misplaced.	• Repair or replace wire.
• DAC defective.	• Replace computer.
• 9 or 25 pin cable defective.	• Replace cables.
• Belt speed relay defective.	• Replace relay.
Symptom #4 — Computer error code MOTOR - SPEED - ERROR	
• Belt speed needs calibration.	• See Calibration and Adjustments (page 4—12).
• Voltage from Bodine controller to DAC not present. The DAC (Digital Analog Control) is a non-repairable component of the computer. There should be approximately 20 VDC between the red and green wires on the 3 pin connection of the DC drive board.	• Replace the drive motor controller.
• DAC voltage is present but not regulated between 4.7 and .47 VDC when different times are programmed into the cooking computer. Measure the voltage between the green and blue wires of the 3 pin connection.	• Replace the computer.

CONVECTION SYSTEM

POSSIBLE CAUSE(S)	SUGGESTED REMEDY
Symptom #1 – Blower motor(s) not running	
• Blower switch off.	• Turn switch to on position.
• No power to the oven.	• Verify power to the oven. If there is no power determine cause.
• Motor fuse blown.	• Replace fuse. Determine the amp draw.
• Faulty start capacitor.	• Replace capacitor.
• Motor burned out.	• Check draw (3 amps or greater).
• Thermal overload tripped.	• Determine if the cooling blower (or fans) are operating. If not, verify voltage to the cooling blower. If voltage is present, replace the cooling blower motor. If voltage is not present, verify voltage through the thermal switch. If no voltage is present, replace the thermal switch.
• No voltage at the motor contactor coil.	• Check for blown fuse or bad blower switch.
• Faulty motor contactor.	• Replace motor contactor.
Symptom #2 – Blower motor(s) do not shut off	
• Faulty motor contactor.	• Replace contactor.
• Faulty thermocouple on Hi/Lo board.	• Refer to the chart on page 6–5 of the Technical Appendix. If the readings do not match replace the thermocouple.
• Faulty Hi/Lo board.	• Determine if 115 VAC is coming out of #7 with the adjustable potentiometer turned completely counter-clockwise. If voltage is still present, replace the board.
• Hi/Lo board is not adjusted properly.	• Check and readjust Hi/Lo board. Refer to page 4–6 of Calibration and Adjustment.
Symptom #3 – Blower motor running backward	
• Motor off by thermal overload (other fans forcing blower to spin).	• Determine if the cooling blower (or fans) are operating. If not, verify voltage to the cooling blower. If voltage is present, replace the cooling blower motor. If voltage is not present, verify voltage through the thermal switch. If no voltage is present, replace the thermal switch.
• Faulty capacitor.	• Replace capacitor.

HEATING SYSTEM

POSSIBLE CAUSE(S)	SUGGESTED REMEDY
Symptom #1 — Burner will not fire (standard controls)	
• Oven in off mode.	• Turn the oven on.
• No power to the oven.	• Determine if the circuit breaker is tripped.
• Fuse blown on the control panel.	• Replace the fuse.
• Determine if the controller setpoint is above actual.	• If the setpoint is not above the actual, reset accordingly.
• Intermittent Ignition Device (IID) system locked out.	• Reference Technical Appendix (page 6—1 through 6—3).
• Air pressure switch may be open.	• Check convection blower for proper operation.
• Blower motor(s) not running.	• Verify voltage to motor. If voltage is present, replace the motor or start capacitor.
• High limit in front panel open.	• Verify that the temperature in the front panel is lower than 140°F (60°C).
• Hi limit on Hi/Lo limit board has been hit.	• Verify that the oven temperature exceeded 600°F (316°C).
• Verify that the pilot goes out when unit is shut down.	• If pilot does not extinguish, replace the pilot valve.
• Verify that combustion motor is spinning and that the centrifugal switch is closed.	• If the motor is not spinning, check the transformer and time delay relay in the control box on the top of the combustion motor. If one or both are bad, replace. If the motor is spinning and there are not 24 volts to the ignition control box, the centrifugal switch is bad. Replace the combustion motor.
• Temperature not programmed into cooking computer.	• Program cook temperature into the computer.
• Time not programmed into cooking computer.	• Programm cook time into the computer.
• Heat relay defective (computer controlled ovens).	• Replace relay.
• Gas pressure to oven too high.	• Lower to specified gas pressure.
• Gas pressure to oven too low.	• Raise to specified gas pressure.

POSSIBLE CAUSE(S)	SUGGESTED REMEDY
Symptom #2 – Burner will not fire (computer controls)	
• Oven in OFF mode.	• Turn to ON position.
• Emergency stop switch on OFF.	• Pull switch out to ON.
• Control circuit breaker tripped.	• Reset breaker.
• Combustion motor not running.	• Check transformer for primary and secondary voltage. • Check main control and burner valve relays to see if closed. • Check relay in combustion burner box. If bad replace relay.
• Main Temperature Controller not set above ambient temperature.	• Set to desired temperature.
• Manual gas valve closed.	• Open valve.
• Intermittent Ignition Device (IID) system locked out.	• Reference Technical Appendix (page 6–1 through 6–3).
• Air pressure switch may be open.	• Check convection blower for proper operation.
• Blower motor(s) not running.	• Verify voltage to motor. If voltage is present, replace the motor or start capacitor.
• High Limit control tripped.	• Verify that 625°F (330°C) high limit is programmed into the controller. If so reset the high limit. Set the computer to 500°F (260°C). Use a pyrometer to verify the oven temperature. If the oven climbs significantly above the setpoint, use the chart in the Technical Appendix (page 6–4) to check the probe. If the probe is alright the computer may need replacement.
• Thermal switch in control compartment tripped.	• Check hood system.
• Excessive intake air temperature.	• Check hood system.
• If pilot fails to go out when the unit is shut down, the solenoid valve is bad.	• Replace valve.

COMPUTER CONTROL SYSTEM

POSSIBLE CAUSE(S)	SUGGESTED REMEDY
Symptom #1 — Computer controller displays: PROBE - OPEN - PROBE - SHORT and alarm buzzer sounds	
• Internal problem with computer controller.	• Verify display integ. in the 2nd level programming. If the controller has been programmed the computer may need to be replaced.
• Loose connections at computer controller.	• Tighten connections.
• Shorted or open RTD probe.	• Use the chart in the Technical Appendix (page 6—4) to determine if probe is bad. Replace if necessary.
Symptom #2 — Computer controller displays: ERROR - HIGH - TEMP - LIMIT	
• Actual temperature exceeds programmed limit value. Default 605°F (319°C).	• Faulty burner valve relay. Replace relay.
• Internal problem with computer controller.	• Verify display integ. in the 2nd level programming. If the controller has been programmed the computer may need to be replaced.
Symptom #3 — Oven will not reach desired temperature	
• Gas pressure to oven is too low.	• Contact local gas representatives.
• Top air plates missing or not adjustable.	• Install/adjust air plates.
• Faulty RTD probe.	• Use the chart in the Technical Appendix (page 6—4) to determine if probe is bad. Replace if necessary.
• Blower motor(s) running backward.	• Verify voltage to motor. If voltage is present, replace the motor or start capacitor.
• Controller out of calibration.	• Recalibrate the controller. See Calibration section (page 4—11).
• Excessive food/debris accumulation blocking the airflow.	• The inside of the oven should be cleaned to remove any materials that could have dropped off the conveyor belt and possibly blocked some of the air flow holes. This would include the removal of the conveyor belt, conveyor belt supports, and the nozzles. The oven interior and all parts removed should then be cleaned with an appropriate oven cleaner safe for aluminum.

Symptom #4 – Burner operates sporadically	
• Air pressure switch may be open.	• Check convection blower (or 4 convection fans) for proper operation.
• Thermal switch tripped.	• Determine the ambient temperature in the control compartment. If above 140°F (60°C) check the cooling fan operation.
• Faulty RTD probe.	• Use the chart in the Technical Appendix (page 6–4) to determine if probe is bad. Replace if necessary.
• Excessive food/debris accumulation blocking the airflow.	• The inside of the oven should be cleaned to remove any materials that could have dropped off the conveyor belt and possibly blocked some of the air flow holes. This would include the removal of the conveyor belt, conveyor belt supports, and the nozzles. The oven interior and all parts removed should then be cleaned with an appropriate oven cleaner safe for aluminum.

CHAPTER 6

TECHNICAL APPENDIX

INTERMITTENT IGNITION SYSTEM

PRINCIPLES OF OPERATION

Pilot flame sensing is a very important aspect of the ignition controls operation. Three zones are needed to give the proper air-gas ratio to produce a blue pilot flame.

Zone 1 – an inner cone that will not burn because excess fuel is present.

Zone 2 – around the inner, fuel rich cone is a blue envelope. This zone contains a mixture of vapor from the fuel rich inner cone and the secondary or surrounding air. This is where combustion occurs, and is the area of highest importance for proper flame sensor location.

Zone 3 – Outside the blue envelope is third zone that contains an excessive quantity of air.

FLAME RECTIFICATION

To identify a current conducted by the flame, we use flame rectification. Place two probes in Zone 2 of the pilot flame. When the surface area of one probe is larger than the other, current tends to flow more in one direction. DC current flows in only one direction, as opposed to AC current, which alternates its direction. The current is rectified from AC to DC by increasing the surface area of one probe and decreasing the surface area of the other.

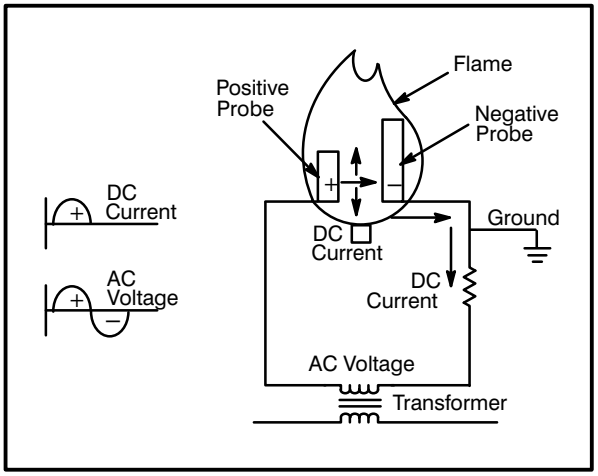

FIGURE 1

In the IID system the probes exposed to the pilot flame are the Flame Sensor and the Pilot Burner Hood. Since the surface area of the pilot hood is larger than the flame sensor, the current rectification process takes place. Current is conducted from terminal 4 at the control through the flame sensor cable to the flame sensor. As the current is conducted through the flame to the pilot hood, it is rectified from AC to DC because of the difference in surface area. The pilot hood is grounded back to the control, thereby completing the circuit.

Flame Sensing Circuit Current

For the ignition control to function properly, a minimum amount of current must flow through the flame sensing circuit.

As the pilot flame is established and current begins to flow in the flame sensing circuit, the current energizes a relay. A minimum amount of current is required to pull-in the relay. When the relay pulls in, one set of contacts opens which shuts off the high energy spark. Another set of contacts closes, putting 24 volts on terminal 3 which opens the main gas valve.

Current vs. Voltage

In normal operation an AC voltage will be present from terminal 4 to ground and a current will be present in the flame sensing circuit.

Even though an AC voltage is present, flame rectification occurs and a DC current flows in the sensing circuit.

For service checkout purposes, measuring these voltages and currents can provide useful information regarding the integrity of the ignition control.

Measuring the current flow rather than voltage is the preferred procedure. Due to the internal circuitry of the ignition control and varying input impedance of voltmeters, the measured voltage will vary depending on type and model of voltmeter being used. However, measuring the current provides a more precise evaluation of the ignition control and flame sensing circuit.

A proper reading not only indicates a functional control, but also verifies all components of the circuit such as flame sensor, cable and ground.

SERVICE PROCEDURES

Service the IID system as follows:

1. Make certain the thermostat contacts are open.
2. Check for proper supply voltage at primary and secondary of system transformer.
3. Close thermostat contacts and observe system.
4. Determine which system condition exists:
   A.) No spark, system does not function
   B.) Spark present but pilot will not light
   C.) Pilot lights but main valve will not open
5. Follow the appropriate service checkout procedure to troubleshoot and repair the system.
6. Observe the system through several complete operating cycles.

VOLTAGE AND CURRENT MEASUREMENTS

When servicing the electronic ignition control there are several times when voltages and currents must be measured or observed.

NOTE: All voltages measured will be AC voltage and all current measured will be DC current.

Terminal	Terminal Use
1	Pilot valve connection between terminal #1 and ground
2	Wire from thermostat
3	Main valve connection between terminal #3 and ground
4	Flame sensor

TABLE 1

To Measure AC Voltages:

1. Set the selector switch on the voltmeter to the AC voltage position.
2. Connect the meter leads in parallel with the voltage to be measured.
3. Read the voltage at the meter.

To Measure DC Flame Sensing Current:

1. Turn off the power supply to the ignition control.
2. Disconnect the flame sensor cable from terminal #4 on Johnson units or terminal #15 on Landis & Gyr units.
3. Set the selector switch on the meter to microamp scale. Connect the positive (red) lead to terminal #4 and the negative (black) lead to the sensor cable.
4. Disconnect the main valve lead from terminal #3. This will prevent the main burner from igniting. A proper measurement of flame sensing current is taken with the pilot light only.
5. Turn the power back on and close the thermostat contacts. Read the current at the meter.

   NOTE: The minimum current required for the Johnson G770 is 0.15DCμA. The minimum current required for the Landis & Gyr is 2.0DCμA. (This unit is polarity specific.)
6. Turn the power off to disconnect the meter and reconnect terminal #3 and #4.

To Measure DC Flame Sensing Current Using the Johnson Y99AU-3 Signal Transducer:

1. Set the function selector switch to the DC voltage position.
2. Turn off the supply voltage to the control.
3. Disconnect the flame sensor cable from terminal #4 on the ignition control.
4. Connect the male 1/4" spade connector (—) to the flame sensor cable. Connect the female 1/4" spade connector (+) to terminal #4.
5. Disconnect the main valve lead from terminal #3 on the ignition control.
6. Turn the supply voltage on and close the thermostat contacts to cycle the system.
7. When the pilot lights, read the current on the meter display.

   NOTE: The conversion factor is 1DC volt — 1 DC microamp.

REPAIRING THE ELECTRONIC IGNITION SYSTEM

Flame Sensing Current Maintenance:

The flame sensor is made of carbon steel and subject to contamination and oxidation buildup. Any buildup on the sensor can add enough resistance to drop the signal below the required minimum. Carbon and oxidation can also build up on the pilot hood. The pilot hood is part of the circuit and must be kept as clean as the flame sensor.

1. Clean the flame sensor with steel wool or an emery cloth.
2. Clean the pilot hood with a small wire brush to remove any carbon or oxidation buildup.

Flame Sensor Replacement:

If the ceramic portion of the flame sensor is broken or if the contamination is extensive, the flame sensor may have to be replaced.

CAUTION!

Shut off all gas to the appliance by closing the shutoff valve in the supply line to that appliance. Disconnect the power supply to prevent electrical shock or possible damage to the equipment.

1. Disconnect the sensing probe cable from the old sensing probe.
2. Remove the old sensing probe from the pilot burner.
3. Check the length of dimension B to be sure the correct replacement probe is being used. See FIGURE 2.
4. Compare the sensing probe rod lengths, dimension A. If required, trim the length of the Y75 rod being installed to the same length as the sensing rod being replaced.

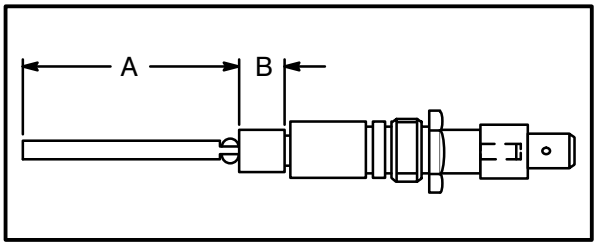

FIGURE 2

5. Install the Y75 sensing probe into the pilot burner. Reconnect the sensing probe cable. The connections to the sensing probe and control terminal must be secure.
6. Restore the power and the gas supply to the appliance.
7. IMPORTANT: Using a microammeter, check the signal passing through the sensing probe.
8. If the microamp signal is marginal, trim the flame sensing probe in increments of 1/8". Be sure that there is still proper flame impingement on the flame sensing probe.

   Flame must surround sensing probe tip for approximately 1/2".
9. Observe at least three complete operating cycles to see that all components are functioning correctly.

Ground Connection

Another important requirement for proper operation is the existence of a good electrical ground between the pilot assembly and the ignition control. This ground provides the path for sensing current to return to the control, thereby completing the sensing circuit.

In most systems we assume the pilot burner is grounded back to the control through the pilot tubing and gas valve. The gas valve would be grounded to the ignition control when the control is mounted on the valve. Controls that are not mounted to a gas valve require a separate grounding wire connecting the control to the pilot assembly.

In some instances this ground can become weak and cause a low sensing current signal. To assure that a proper ground exists between the control and pilot, a wire can be installed from one of the ground terminals to the pilot bracket. This will assure a strong ground and maintain a proper sensing current signal.

Using a 1/4" female spade connector, connect one end of the new wire to the ground strip on the ignition control. Attach the other end of the wire to a bolt or screw on the pilot burner bracket. Be sure to use a wire with a high temperature rated insulation.

COOKING COMPUTER — TEMPERATURE VS RESISTANCE

T/F	Res/Ohms	T/F	Res/Ohms	T/F	Res/Ohms	T/F	Res/Ohms
70	541.12	230	711.43	390	877.15	550	1038.293
75	546.51	235	716.68	395	882.26	555	1043.255
80	551.9	240	721.92	400	887.36	560	1048.212
85	557.28	245	727.16	405	892.46	565	1053.165
90	562.66	250	732.4	410	897.55	570	1058.113
95	568.04	255	737.63	415	902.63	575	1063.057
100	573.4	260	742.85	420	907.72	580	1067.997
105	578.77	265	748.05	425	912.8	585	1072.931
110	584.13	270	753.29	430	917.87	590	1077.862
115	589.48	275	758.5	435	922.94	600	1087.709
120	594.84	280	763.71	440	928.002	605	1092.626
125	600.18	285	768.91	445	933.062	610	1097.539
130	605.53	290	774.11	450	938.118	615	1102.447
135	610.86	295	779.31	455	943.17	620	1107.35
140	616.2	300	784.5	460	948.216	625	1112.249
145	621.52	305	789.68	465	953.259	630	1117.1
150	626.85	310	794.87	470	958.296	635	1122
155	632.17	315	800.04	475	963.33	640	1126.9
160	637.48	320	805.21	480	968.359	645	1131.8
165	642.8	325	810.38	485	973.383	650	1136.7
170	648.1	330	815.54	490	978.403	655	1141.6
175	653.4	335	820.7	495	983.419	660	1146.4
180	658.7	340	825.86	500	988.43	665	1151.3
185	663.99	345	831.01	505	993.436	670	1156.1
190	669.28	350	836.15	510	998.438	675	1161
195	674.57	355	841.29	515	1003.436	680	1165.8
200	679.85	360	846.43	520	1008.429	685	1170.7
205	685.12	365	851.56	525	1013.417	690	1175.5
210	690.39	370	856.69	530	1018.402	695	1180.4
215	695.66	375	861.81	535	1023.381	700	1185.2
220	700.92	380	866.93	540	1028.356		
225	706.18	385	872.04	545	1033.327		

TABLE 2

THERMOELECTRIC VOLTAGE IN ABSOLUTER MILLIVOLTS — TYPE J THERMOCOUPLE

°F	Reading	+5°F
10	−0.611	−0.473
20	−0.334	−0.195
30	−0.056	0.084
40	0.224	0.365
50	0.507	0.648
60	0.791	0.933
70	1.076	1.220
80	1.363	1.507
90	1.652	1.797
100	1.942	2.088
110	2.233	2.380
120	2.526	2.673
130	2.820	2.967
140	3.115	3.263
150	3.411	3.560
160	3.708	3.857
170	4.006	4.156
180	4.305	4.455
190	4.605	4.755
200	4.906	5.057
210	5.207	5.358
220	5.509	5.661
230	5.812	5.964
240	6.116	6.268
250	6.420	6.572
260	6.724	6.877
270	7.029	7.182
280	7.335	7.488
290	7.641	7.794
300	7.947	8.100
310	8.253	8.407
320	8.560	8.714
330	8.867	9.021
340	9.175	9.329
350	9.483	9.636

°F	Reading	+5°F
360	9.790	9.944
370	10.098	10.252
380	10.407	10.561
390	10.715	10.869
400	11.023	11.177
410	11.332	11.486
420	11.640	11.794
430	11.949	12.103
440	12.257	12.411
450	12.566	12.720
460	12.874	12.029
470	13.183	13.337
480	13.491	13.645
490	13.800	13.954
500	14.108	14.262
510	14.416	14.570
520	14.724	14.878
530	15.032	15.186
540	15.340	15.494
550	15.648	15.802
560	15.956	16.110
570	16.264	16.417
580	16.571	16.725
590	16.879	17.032
600	17.186	17.339
610	17.493	17.646
620	17.800	17.953
630	18.107	18.260
640	18.414	18.567
650	18.721	18.874
660	19.027	19.180
670	19.334	19.487
680	19.640	19.793
690	19.947	20.100

TABLE 3

CONVERSION FACTORS

COMMON CONVERSION FACTORS		
Multiply	**By**	**To Get**
BTU/hr	.001054804	MJ/hr
	.0002931	kW
	.29285	W
BTU/Ft^3	.0372589	MJ/m^3
	8.905102	$kcal/m^3$
MJ/hr	948.0434279	BTU/hr
Mj/m^3	26,839225	BTU/ft^3
kW	3414.71732	BTU/hr
ft^3	.02832	m^3
ft^2	.09290304	m^2
inches	25.40005	mm
feet	.3048	meters
meters	3.281	feet
pounds	.4536	kg
inches W.C.	.249082	kPa
	2.49082	mbar
kPa	4.01885	inches W.C.
	10	mbar
mbar	0.401474	inches W.C.
kW	3.6	Mj/hr
$kcal/m^3$	.1122952	BTU/ft^3
Kwh/m^3	96.65	BTU/ft^3

TABLE 4

PRESSURE CONVERSIONS FACTORS		
Multiply	**By**	**To Get**
in/H_2O	0.0361	P.S.I.
	25.41	mm/H_2O
	1.868	mm/Hg
	.0025	kg/cm^2
	.0025	bar
	2.489	mbar
	248.9	Pa
	.2489	kPa
P.S.I	27.71	in. H_2O
	2.036	in. Hg
	703.1	mm/H_2O
	51.75	mm/Hg
	.0703	kg/cm^2
	.0689	bar
	68.95	mbar
	6895	Pa
	6.895	kPa

TABLE 5

UNIT CONVERSIONS
1°F = .5556°C
1°C = 1.8°F

TABLE 6

PRESSURE CONVERSION

PRESSURE CONVERSION CHART									
in/H_2O	P.S.I	in/Hg	mm/H_2O	mm/Hg	kg/cm^2	bar	mbar	Pa	kPa
1	.0361	.0735	25.41	1.868	.0025	.0025	2.489	248.9	.2489
2	.0722	.1470	50.81	3.736	.0051	.0050	4.978	497.8	.4978
3	.1083	.2205	76.22	5.604	.0076	.0075	7.467	746.7	.7467
4	.1444	.2940	101.62	7.472	.0102	.0099	9.956	995.6	.9956
5	.1804	.3673	127.0	9.335	.0127	.0124	12.44	1244	1.244
6	.2165	.4408	152.4	11.203	.0152	.0149	14.93	1493	1.493
7	.2526	.5143	177.8	13.072	.0178	.0174	17.42	1742	1.742
8	.2887	.5878	203.2	14.940	.0203	.0199	19.90	1990	1.990
9	.3248	.6613	228.6	16.808	.0228	.0224	22.39	2239	2.239
10	.3609	.7348	254.0	18.676	.0254	.0249	24.88	2488	2.488
11	.3970	.8083	279.4	20.544	.0279	.0274	27.37	2737	2.737
12	.4331	.8818	304.8	22.412	.0304	.0299	29.86	2986	2.986
13	.4692	.9553	330.2	24.280	.0330	.0324	32.35	3235	3.235
14	.5053	1.029	355.6	26.148	.0355	.0348	34.84	3484	3.484
15	.5414	1.102	381.0	28.016	.0381	.0373	37.33	3733	3.733
16	.5774	1.176	406.4	29.879	.0406	.0398	39.81	3981	3.981
17	.6136	1.249	431.8	31.752	.0431	.0423	42.31	4231	4.231
18	.6496	1.322	457.2	33.616	.0457	.0448	44.79	4479	4.479
19	.6857	1.396	482.6	35.484	.0482	.0473	47.28	4728	4.728
20	.7218	1.470	508.0	37.352	.0507	.0498	49.77	4977	4.977
21	.7579	1.543	533.4	39.22	.0533	.0523	52.26	5226	5.226
22	.7940	1.616	558.8	41.09	.0558	.0547	54.74	5474	5.474
23	.8301	1.690	584.2	42.96	.0584	.0572	57.23	5723	5.723
24	.8662	1.764	609.6	44.82	.0609	.0597	59.72	5972	5.972
25	.9023	1.837	635.0	46.69	.0634	.0622	62.21	6221	6.221
26	.9384	1.910	660.4	48.56	.0660	.0647	64.70	6470	6.470
27	.9745	1.984	685.8	50.43	.0685	.0672	67.19	6719	6.719

in/H_2O	P.S.I	in/Hg	mm/H_2O	mm/Hg	kg/cm^2	bar	mbar	Pa	kPa
28	1.010	2.056	710.8	52.26	.0710	.0696	69.64	6964	6.964
29	1.047	2.132	736.8	54.18	.0736	.0722	72.19	7219	7.219
30	1.083	2.205	762.2	56.04	.0761	.0747	74.67	7467	7.467
31	1.119	2.278	787.5	57.91	.0787	.0772	77.15	7715	7.715
32	1.155	2.352	812.8	59.77	.0812	.0796	79.63	7963	7.963
33	1.191	2.425	838.2	61.63	.0837	.0821	82.12	8212	8.212
34	1.227	2.498	863.5	63.49	.0862	.0846	84.60	8460	8.460
35	1.263	2.571	888.9	65.36	.0888	.0871	87.08	8708	8.708
36	1.299	2.645	914.2	67.22	.0913	.0896	89.56	8956	8.956
37	1.335	2.718	939.5	69.08	.0938	.0920	92.04	9204	9.204
38	1.371	2.791	964.9	70.95	.0964	.0945	94.53	9453	9.453
39	1.408	2.867	990.9	72.86	.0990	.0971	97.08	9708	9.708
40	1.444	2.940	1016	74.72	.1015	.0996	99.56	9956	9.956
41	1.480	3.013	1042	76.59	.1040	.1020	102.0	10204	10.20
42	1.516	3.086	1067	78.45	.1066	.1045	104.5	10452	10.45
43	1.552	3.160	1092	80.31	.1091	.1070	107.0	10701	10.70
44	1.588	3.233	1118	82.18	.1116	.1095	109.5	10949	10.95
45	1.624	3.306	1143	84.04	.1142	.1120	112.0	11197	11.20
46	1.660	3.378	1168	85.90	.1167	.1144	114.5	11445	11.44
47	1.696	3.453	1194	87.76	.1192	.1169	116.9	11694	11.69
48	1.732	3.526	1219	89.63	.1218	.1194	119.4	11942	11.94
49	1.768	3.600	1244	91.49	.1243	.1219	121.9	12190	12.19
50	1.804	3.673	1270	93.35	.1268	.1244	124.4	12438	12.44
51	1.841	3.748	1296	95.27	.1294	.1269	126.9	12693	12.69
52	1.877	3.822	1321	97.13	.1320	.1294	129.4	12941	12.94
53	1.913	3.895	1346	98.99	.1345	.1319	131.9	13190	13.19
54	1.949	3.968	1372	100.8	.1370	.1344	134.4	13438	13.44
55	1.985	4.041	1397	102.7	.1395	.1369	136.9	13686	13.69
56	2.021	4.115	1422	104.6	.1421	.1393	139.3	13934	13.93

TABLE 7